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Contents

Contents of previous issues can be found by consulting the Industrial Arts Index and the Engineering Index, Inc. at your library

• Special Article

Further Tables for Use in Computing Small Color Differences 353
G L Buc

• Departments

Abstracts 355
Book Reviews 356
News 375

• Proceedings of the American Association of Textile Chemists and Colorists

Calendar P358
Employment Register P358
Hotel Reservations for 1952 Convention P358
30th Anniversary Celebration of New York Section . P359
Meeting Report—NBTI Student Chapter P359
Meeting Report—UTI Student Chapter P359
Rhode Island Section:—
Continuous Fiber Dyeing P360
S H Williams
Meeting Report—Hudson-Mohawk Section P364
Minutes of Piedmont Section Research Committee Meeting P364
Auxiliaries and Testing Group:—
Organic Complexing Agents in Textile Processing P365
John J Singer and Frederick C Bersworth
Meeting Report—Western New England Section . . P370
One Hundred and Eighty-First Council Meeting P371
Pacific Southwest Section Announces Two Meeting Dates P372
WNE Section to Hold Outing in Wallingford P372

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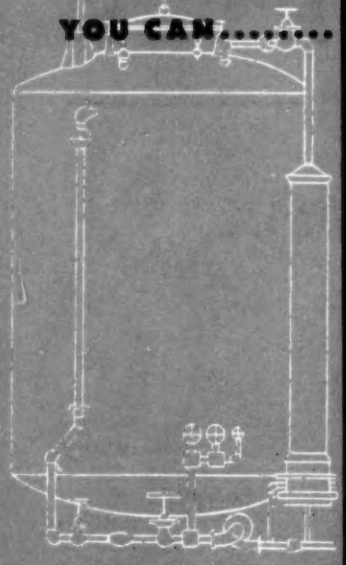

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This technical bulletin contains 10 pages of helpful test-data that show how variations in alkali concentrations, boiling times and NACCONOL additions effect the consumption of chemicals, and the cleanliness and absorbency of the finished cotton. These results will be helpful to any mill man concerned with the cost of kiering raw cotton or cotton piece goods. For your copy of this bulletin, write or phone our nearest office.

AMERICAN
DYESTUFF REPORTER

VOLUME 41 JUNE 9, 1952 NUMBER 12

FURTHER TABLES FOR USE IN COMPUTING SMALL COLOR DIFFERENCES

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Application Research Department
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THE Adam's Chromatic value formula for small color differences appears to correlate with visual observation about as well as other small color difference formulas *(1)*. Where CIE (formerly called ICI) tristimulus values X, Y, Z are available the Adam's Chromatic value formula has the advantage over other small color difference formulas that it is easier and quicker to compute *(2)*. The CIE tristimulus values X, Y, Z are obtainable by well known methods *(3)* from spectrophotometric curves. These methods may be applied manually or as in the use of integrating spectrophotometers, mechanically or electronically.

Adequate approximations for color difference work to tristimulus values may also be obtained using commercially available three filter photometers. However, the data obtained from such instruments are often more suitable for direct substitution in one of the other small color difference formulas.

Nickerson *(2)* has published tables which facilitate changing the CIE tristimulus values X, Y, Z to the values V_X, V_Y, V_Z which are used in the Adam's Chromatic value formula which may be stated

$$\triangle E_A = f\left\{(0.23 \triangle V_Y)^2 + [\triangle(V_X - V_Y)]^2 + [0.4 \triangle (V_Z - V_Y)]^2\right\}^{1/2}$$

It may be noted that in *(1)* the formula for $\triangle E_A$ has an 0.04 in place of the correct 0.4 in *(2)*. There is a discussion of the factor f in *(2)* and a value of f of 40 is suggested to bring color differences in the Adam's Chromatic value system into line with the Judd and Nickerson formulas.

Once $\triangle V_Y$, $\triangle(V_X - V_Y)$ and $\triangle(V_Z - V_Y)$ have been computed from the values of X, Y, and Z for the two samples it is necessary to find $(0.23\triangle V_Y)^2$, $\triangle(V_X - V_Y)^2$ and $[0.4\triangle(V_Z - V_Y)]^2$ and obtain the square root of the sum of these three terms. Although a computing machine can be used and tables of squares and square roots are also useful, a computing machine is not always available and tables of squares do not perform enough of the computation. Table I is useful for the purpose of obtaining the squares multiplied by the proper factors and for taking the final square root. The first column is entered for the differences required, i e, for either $\triangle V_Y$, $\triangle(V_X - V_Y)$ or $\triangle(V_Z - V_Y)$. The second column gives the values for $[\triangle(V_X - V_Y)]^2$, the third column for $(0.23\triangle V_Y)^2$ and the fourth for $[0.4\triangle(V_Z - V_Y)]^2$. It is to be noted that the numbers in Columns 2, 3 and 4 are 10,000 times as large as the right values. This offers no difficulties as will be seen later on and simplifies the printing of the tables and the computations the tables are intended to facilitate.

As an example suppose that the following have been obtained: $\triangle V_Y = 0.09$, $\triangle(V_X - V_Y) = 0.01$ and $\triangle(V_Z - V_Y) = 0.004$. Then from the table

$(0.23\triangle V_Y)^2$	= 4.285
$[\triangle(V_X - V_Y)]^2$	= 1.000
$[0.4\triangle V_Z - V_Y)]^2$	= 2.560
	7.845

Now 7.845 is looked up in Column 2 and its square root is read in Column 1. This gives 0.028. The result is in Adam's Chromatic value units where f = 1. Adjustment to the f value of choice is made merely by multiplying by the f value chosen. Thus if f is chosen as 40 as recommended by Nickerson *(2)* the color difference is 40 x 0.028 = 1.12. If 10 is chosen *(4)* then the color difference is 0.28. This example is identical to the one given by Nickerson *(2)*.

The tables go as far as $\triangle = 0.500$. Hence if in the Adam's Chromatic value formula $\triangle V_Y$, were equal to 0.500 and the other $\triangle$'s were 0, $\triangle E_A$, using a value of f = 40 would be 4.6. For $\triangle(V_X - V_Y)$ equal to 0.500 $\triangle E_A$ is 20 units and for $\triangle(V_Z - V_Y)$ equal to 0.500 $\triangle E_A$ is equal to 8 units. Since an Adam's Chromatic value unit using a factor of 40 is about equivalent to a Judd unit *(2)* even the smallest of these corresponds closely to 4.6 Judd units. A Judd unit is a unit *(2)* of "some commercial importance" and is *(5)* "about 10 times the least chromaticity difference perceptible with certainty under the most favorable conditions". Hence, there probably is little interest in differences much larger than this and no particular need to extend the table beyond this point. However, if the need does arise, computations for $\triangle$'s 10 times as large as those given, may be made merely by shifting the decimal point one place to the right in Column 1, at the same time shifting it two places in Columns 2, 3 and 4.

It is a pleasure to acknowledge the aid of C W Young of the Calco Tabulating Department who computed the table on IBM equipment.

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2) Nickerson, D, "Tables for Use in Computing Small Color Differences", *Am Dyestuff Reptr* 39, 541-9 (1950).
3) Hardy, A C, *Handbook of Colorimetry*, Technology Press, Cambridge, Mass (1936).
4) Godlove, I H, "Uniformity of Grading of the American, British and German Light Fastness Standards" (Report from AATCC Color Committee), *Am Dyestuff Reptr* 39, P215-21 (1950).
5) Judd, D B, *Nat Bur Standards Circular* 478, 30.

TABLE I

Col 1 Δ	Col 2 $[\Delta(V_x-V_y)]^2$	Col 3 $(0.23\Delta V_y)^2$	Col 4 $[0.4\Delta(V_x-V_y)]^2$
.001	.01	.000529	.0016
.002	.04	.002116	.0064
.003	.09	.004761	.0144
.004	.16	.008464	.0256
.005	.25	.01323	.0400
.006	.36	.01904	.0576
.007	.49	.02592	.0784
.008	.64	.03386	.1024
.009	.81	.04285	.1296
.010	1.00	.05290	.1600
.011	1.21	.06401	.1936
.012	1.44	.07618	.2304
.013	1.69	.08940	.2704
.014	1.96	.1037	.3136
.015	2.25	.1190	.3600
.016	2.56	.1354	.4096
.017	2.89	.1529	.4624
.018	3.24	.1714	.5184
.019	3.61	.1910	.5776
.020	4.00	.2116	.6400
.021	4.41	.2333	.7056
.022	4.84	.2560	.7744
.023	5.29	.2798	.8464
.024	5.76	.3047	.9216
.025	6.25	.3306	1.000
.026	6.76	.3576	1.082
.027	7.29	.3856	1.166
.028	7.84	.4147	1.254
.029	8.41	.4449	1.346
.030	9.00	.4761	1.440
.031	9.61	.5084	1.538
.032	10.24	.5417	1.638
.033	10.89	.5761	1.742
.034	11.56	.6115	1.850
.035	12.25	.6480	1.960
.036	12.96	.6856	2.074
.037	13.69	.7242	2.190
.038	14.44	.7639	2.310
.039	15.21	.8046	2.434
.040	16.00	.8464	2.560
.041	16.81	.8892	2.690
.042	17.64	.9332	2.822
.043	18.49	.9781	2.958
.044	19.36	1.024	3.099
.045	20.25	1.071	3.240
.046	21.16	1.119	3.386
.047	22.09	1.169	3.534
.048	23.04	1.219	3.686
.049	24.01	1.270	3.841
.050	25.00	1.323	4.000
.051	26.01	1.376	4.161
.052	27.04	1.430	4.326
.053	28.09	1.486	4.494
.054	29.16	1.543	4.666
.055	30.25	1.600	4.840
.056	31.36	1.659	5.018
.057	32.49	1.719	5.198
.058	33.64	1.780	5.382
.059	34.81	1.841	5.570
.060	36.00	1.904	5.760
.061	37.21	1.968	5.954
.062	38.44	2.033	6.150
.063	39.69	2.100	6.350
.064	40.96	2.167	6.554
.065	42.25	2.235	6.760
.066	43.56	2.304	6.970
.067	44.89	2.375	7.182
.068	46.24	2.446	7.398
.069	47.61	2.519	7.618
.070	49.00	2.592	7.840
.071	50.41	2.667	8.066
.072	51.84	2.742	8.294
.073	53.29	2.819	8.526
.074	54.76	2.897	8.762
.075	56.25	2.976	9.000
.076	57.76	3.056	9.241
.077	59.29	3.136	9.486
.078	60.84	3.218	9.734
.079	62.41	3.301	9.986
.080	64.00	3.386	10.24
.081	65.61	3.471	10.50
.082	67.24	3.557	10.76
.083	68.89	3.644	11.02
.084	70.56	3.733	11.29
.085	72.25	3.822	11.56
.086	73.96	3.912	11.83
.087	75.69	4.004	12.11
.088	77.44	4.097	12.39
.089	79.21	4.190	12.67
.090	81.00	4.285	12.96
.091	82.81	4.381	13.25
.092	84.64	4.477	13.54
.093	86.49	4.575	13.84
.094	88.36	4.674	14.14
.095	90.25	4.774	14.44
.096	92.16	4.875	14.75
.097	94.09	4.977	15.05
.098	96.04	5.081	15.37
.099	98.01	5.185	15.68
.100	100.0	5.290	16.00
.101	102.0	5.396	16.32
.102	104.0	5.504	16.65
.103	106.1	5.612	16.97
.104	108.2	5.722	17.31
.105	110.3	5.832	17.64
.106	112.4	5.944	17.98
.107	114.5	6.057	18.32
.108	116.6	6.170	18.66
.109	118.8	6.285	19.01
.110	121.0	6.401	19.36
.111	123.2	6.518	19.71
.112	125.4	6.636	20.07
.113	127.7	6.755	20.43
.114	130.0	6.875	20.79
.115	132.3	6.996	21.16
.116	134.6	7.118	21.53
.117	136.9	7.241	21.90
.118	139.2	7.366	22.28
.119	141.6	7.491	22.66
.120	144.0	7.618	23.04
.121	146.4	7.745	23.43
.122	148.8	7.874	23.81
.123	151.3	8.003	24.21
.124	153.8	8.134	24.60
.125	156.3	8.266	25.00
.126	158.8	8.398	25.40
.127	161.3	8.532	25.81
.128	163.8	8.667	26.21
.129	166.4	8.803	26.63
.130	169.0	8.940	27.04
.131	171.6	9.078	27.46
.132	174.2	9.217	27.88
.133	176.9	9.357	28.30
.134	179.6	9.499	28.73
.135	182.3	9.641	29.16
.136	185.0	9.784	29.59
.137	187.7	9.929	30.03
.138	190.4	10.07	30.47
.139	193.2	10.22	30.91
.140	196.0	10.37	31.36
.141	198.8	10.52	31.81
.142	201.6	10.67	32.26
.143	204.5	10.82	32.72
.144	207.4	10.97	33.18
.145	210.3	11.12	33.64
.146	213.1	11.28	34.11
.147	216.1	11.43	34.57
.148	219.0	11.59	35.05
.149	222.0	11.74	35.52
.150	225.0	11.90	36.00
.151	228.0	12.06	36.48
.152	231.0	12.22	36.97
.153	234.1	12.38	37.45
.154	237.2	12.55	37.95
.155	240.3	12.71	38.44
.156	243.4	12.87	38.94
.157	246.5	13.04	39.44
.158	249.6	13.21	39.94
.159	252.8	13.37	40.45
.160	256.0	13.54	40.96
.161	259.2	13.71	41.47
.162	262.4	13.88	41.99
.163	265.7	14.06	42.51
.164	269.0	14.23	43.03
.165	272.3	14.40	43.56
.166	275.6	14.58	44.09
.167	278.9	14.75	44.62
.168	282.2	14.93	45.16
.169	285.6	15.11	45.70
.170	289.0	15.29	46.24
.171	292.4	15.47	46.79
.172	295.8	15.65	47.33
.173	299.3	15.83	47.89
.174	302.8	16.02	48.44
.175	306.3	16.20	49.00
.176	309.8	16.39	49.56
.177	313.3	16.57	50.13
.178	316.8	16.76	50.69
.179	320.4	16.95	51.27
.180	324.0	17.14	51.84
.181	327.6	17.33	52.42
.182	331.2	17.52	53.00
.183	334.9	17.72	53.58
.184	338.6	17.91	54.17
.185	342.3	18.11	54.76
.186	346.0	18.30	55.35
.187	349.7	18.50	55.95
.188	353.4	18.70	56.55
.189	357.2	18.90	57.15
.190	361.0	19.10	57.76
.191	364.8	19.30	58.37
.192	368.6	19.50	58.98
.193	372.5	19.70	59.60
.194	376.4	19.91	60.22
.195	380.3	20.12	60.84
.196	384.2	20.32	61.47
.197	388.1	20.53	62.09
.198	392.0	20.74	62.73
.199	396.0	20.95	63.36
.200	400.0	21.16	64.00
.201	404.0	21.37	64.64
.202	408.0	21.59	65.29
.203	412.1	21.80	65.93
.204	416.2	22.01	66.59
.205	420.3	22.23	67.24
.206	424.4	22.45	67.90
.207	428.5	22.67	68.56
.208	432.6	22.89	69.22
.209	436.8	23.11	69.89
.210	441.0	23.33	70.56
.211	445.2	23.55	71.23
.212	449.4	23.78	71.91
.213	453.7	24.00	72.59
.214	458.0	24.23	73.27
.215	462.3	24.46	73.96
.216	466.6	24.68	74.65
.217	470.9	24.91	75.34
.218	475.2	25.14	76.04
.219	479.6	25.37	76.74
.220	484.0	25.60	77.44
.221	488.4	25.84	78.15
.222	492.8	26.07	78.85
.223	497.3	26.31	79.57
.224	501.8	26.54	80.28
.225	506.3	26.78	81.00
.226	510.8	27.02	81.72
.227	515.3	27.26	82.45
.228	519.8	27.50	83.17
.229	524.4	27.74	83.91
.230	529.0	27.98	84.64
.231	533.6	28.23	85.38
.232	538.2	28.47	86.12
.233	542.9	28.72	86.86
.234	547.6	28.97	87.61
.235	552.3	29.21	88.36
.236	557.0	29.46	89.11
.237	561.7	29.71	89.87
.238	566.4	29.96	90.63
.239	571.2	30.22	91.39
.240	576.0	30.47	92.16
.241	580.8	30.72	92.93
.242	585.6	30.98	93.70
.243	590.5	31.24	94.48
.244	595.4	31.49	95.26
.245	600.3	31.75	96.04
.246	605.2	32.01	96.83
.247	610.1	32.27	97.61
.248	615.0	32.54	98.41
.249	620.0	32.80	99.20
.250	625.0	33.06	100.0
.251	630.0	33.33	100.8
.252	635.0	33.59	101.6
.253	640.1	33.86	102.4
.254	645.2	34.13	103.2
.255	650.3	34.40	104.0
.256	655.4	34.67	104.9
.257	660.5	34.94	105.7
.258	665.6	35.21	106.5
.259	670.8	35.49	107.3
.260	676.0	35.76	108.2
.261	681.2	36.04	109.0
.262	686.4	36.31	109.8
.263	691.7	36.59	110.7
.264	697.0	36.87	111.5
.265	702.3	37.15	112.4
.266	707.6	37.43	113.2
.267	712.9	37.71	114.1
.268	718.2	37.99	114.9
.269	723.6	38.28	115.8
.270	729.0	38.56	116.6
.271	734.4	38.85	117.5
.272	739.8	39.14	118.4
.273	745.3	39.43	119.2
.274	750.8	39.72	120.1
.275	756.3	40.01	121.0
.276	761.8	40.30	121.9
.277	767.3	40.59	122.8
.278	772.8	40.88	123.7
.279	778.4	41.18	124.5
.280	784.0	41.47	125.4
.281	789.6	41.77	126.3
.282	795.2	42.07	127.2
.283	800.9	42.37	128.1
.284	806.6	42.67	129.0
.285	812.3	42.97	130.0
.286	818.0	43.27	130.9
.287	823.7	43.57	131.8
.288	829.4	43.88	132.7
.289	835.2	44.18	133.6
.290	841.0	44.49	134.6
.291	846.8	44.80	135.5
.292	852.6	45.10	136.4
.293	858.5	45.41	137.4
.294	864.4	45.72	138.3
.295	870.3	46.04	139.2
.296	876.2	46.35	140.2
.297	882.1	46.66	141.1
.298	888.0	46.98	142.1
.299	894.0	47.29	143.0
.300	900.0	47.61	144.0

Col 1 Δ	Col 2 $[\Delta(V_x—V_y)]^2$	Col 3 $(0.23\Delta V_y)^2$	Col 4 $[0.4\Delta(V_x—V_y)]^2$
.301	906.0	47.93	145.0
.302	912.0	48.25	145.9
.303	918.1	48.57	146.9
.304	924.2	48.89	147.9
.305	930.3	49.21	148.8
.306	936.4	49.53	149.8
.307	942.5	49.86	150.8
.308	948.6	50.18	151.8
.309	954.8	50.51	152.8
.310	961.0	50.84	153.8
.311	967.2	51.17	154.8
.312	973.4	51.49	155.8
.313	979.7	51.83	156.8
.314	986.0	52.16	157.8
.315	992.3	52.49	158.8
.316	998.6	52.82	159.8
.317	1005.	53.16	160.8
.318	1011.	53.49	161.8
.319	1018.	53.83	162.8
.320	1024.	54.17	163.8
.321	1030.	54.51	164.9
.322	1037.	54.85	165.9
.323	1043.	55.19	166.9
.324	1050.	55.53	168.0
.325	1056.	55.88	169.0
.326	1063.	56.22	170.0
.327	1069.	56.57	171.1
.328	1076.	56.91	172.1
.329	1082.	57.26	173.2
.330	1089.	57.61	174.2
.331	1096.	57.96	175.3
.332	1102.	58.31	176.4
.333	1109.	58.66	177.4
.334	1116.	59.01	178.5
.335	1122.	59.37	179.6
.336	1129.	59.72	180.6
.337	1136.	60.08	181.7
.338	1142.	60.44	182.8
.339	1149.	60.79	183.9
.340	1156.	61.15	185.0
.341	1163.	61.51	186.0
.342	1170.	61.87	187.1
.343	1176.	62.24	188.2
.344	1183.	62.60	189.3
.345	1190.	62.96	190.4
.346	1197.	63.33	191.5
.347	1204.	63.70	192.7
.348	1211.	64.06	193.8
.349	1218.	64.43	194.9
.350	1225.	64.80	196.0
.351	1232.	65.17	197.1
.352	1239.	65.55	198.2
.353	1246.	65.91	199.4
.354	1253.	66.29	200.5
.355	1260.	66.67	201.6
.356	1267.	67.04	202.8
.357	1274.	67.42	203.9
.358	1282.	67.80	205.1
.359	1289.	68.18	206.2
.360	1296.	68.56	207.4
.361	1303.	68.94	208.5
.362	1310.	69.32	209.7
.363	1318.	69.71	210.8
.364	1325.	70.09	212.0
.365	1332.	70.48	213.2
.366	1339.	70.86	214.3
.367	1347.	71.25	215.5
.368	1354.	71.64	216.7
.369	1361.	72.03	217.9
.370	1369.	72.42	219.0
.371	1376.	72.81	220.2
.372	1384.	73.21	221.4
.373	1391.	73.60	222.6
.374	1399.	73.99	223.8
.375	1406.	74.39	225.0
.376	1414.	74.79	226.2
.377	1421.	75.19	227.4
.378	1429.	75.59	228.6
.379	1436.	75.99	229.8
.380	1444.	76.39	231.0
.381	1452.	76.79	232.3
.382	1459.	77.19	233.5
.383	1467.	77.60	234.7
.384	1475.	78.00	235.9
.385	1482.	78.41	237.2
.386	1490.	78.82	238.4
.387	1498.	79.23	239.6
.388	1505.	79.64	240.9
.389	1513.	80.05	242.1
.390	1521.	80.46	243.4
.391	1529.	80.87	244.6
.392	1537.	81.29	245.9
.393	1544.	81.70	247.1
.394	1552.	82.12	248.4
.395	1560.	82.54	249.6
.396	1568.	82.96	250.9
.397	1576.	83.38	252.2
.398	1584.	83.80	253.4
.399	1592.	84.22	254.7
.400	1600.	84.64	256.0
.401	1608.	85.06	257.3
.402	1616.	85.49	258.6
.403	1624.	85.91	259.9
.404	1632.	86.34	261.1
.405	1640.	86.77	262.4
.406	1648.	87.20	263.7
.407	1656.	87.63	265.0
.408	1665.	88.06	266.3
.409	1673.	88.49	267.6
.410	1681.	88.92	269.0
.411	1689.	89.36	270.3
.412	1697.	89.79	271.6
.413	1706.	90.23	272.9
.414	1714.	90.67	274.2
.415	1722.	91.11	275.6
.416	1731.	91.55	276.9
.417	1739.	91.99	278.2
.418	1747.	92.43	279.6
.419	1756.	92.87	280.9
.420	1764.	93.32	282.2
.421	1772.	93.76	283.6
.422	1781.	94.21	284.9
.423	1789.	94.65	286.3
.424	1798.	95.10	287.6
.425	1806.	95.55	289.0
.426	1815.	96.00	290.4
.427	1823.	96.45	291.7
.428	1832.	96.90	293.1
.429	1840.	97.36	294.5
.430	1849.	97.81	295.8
.431	1858.	98.27	297.2
.432	1866.	98.72	298.6
.433	1875.	99.18	300.0
.434	1884.	99.64	301.4
.435	1892.	100.1	302.8
.436	1901.	100.6	304.2
.437	1910.	101.0	305.6
.438	1918.	101.5	307.0
.439	1927.	101.9	308.4
.440	1936.	102.4	309.8
.441	1945.	102.9	311.2
.442	1954.	103.3	312.6
.443	1962.	103.8	314.0
.444	1971.	104.3	315.4
.445	1980.	104.8	316.8
.446	1989.	105.2	318.3
.447	1998.	105.7	319.7
.448	2007.	106.2	321.1
.449	2016.	106.6	322.6
.450	2025.	107.1	324.0
.451	2034.	107.6	325.4
.452	2043.	108.1	326.9
.453	2052.	108.6	328.3
.454	2061.	109.0	329.8
.455	2070.	109.5	331.2
.456	2079.	110.0	332.7
.457	2088.	110.5	334.2
.458	2098.	111.0	335.6
.459	2107.	111.5	337.1
.460	2116.	111.9	338.6
.461	2125.	112.4	340.0
.462	2134.	112.9	341.5
.463	2146.	113.4	343.0
.464	2153.	113.9	344.5
.465	2162.	114.4	346.0
.466	2172.	114.9	347.4
.467	2181.	115.4	348.9
.468	2190.	115.9	350.4
.469	2200.	116.4	351.9
.470	2209.	116.9	353.4
.471	2218.	117.4	354.9
.472	2228.	117.9	356.5
.473	2237.	118.4	358.0
.474	2247.	118.9	359.5
.475	2256.	119.4	361.0
.476	2266.	119.9	362.5
.477	2275.	120.4	364.0
.478	2285.	120.9	365.6
.479	2294.	121.4	367.1
.480	2304.	121.9	368.6
.481	2314.	122.4	370.2
.482	2323.	122.9	371.7
.483	2333.	123.4	373.3
.484	2343.	123.9	374.8
.485	2352.	124.4	376.4
.486	2362.	124.9	377.9
.487	2372.	125.4	379.5
.488	2381.	126.0	381.0
.489	2391.	126.5	382.6
.490	2401.	127.0	384.2
.491	2411.	127.5	385.7
.492	2421.	128.1	387.3
.493	2430.	128.6	388.9
.494	2440.	129.1	390.5
.495	2450.	129.6	392.0
.496	2460.	130.1	393.6
.497	2470.	130.7	395.2
.498	2480.	131.2	396.8
.499	2490.	131.7	398.4
.500	2500.	132.3	400.0

ABSTRACTS

Lithium Compounds and Their Possible Application for Textile Processing

J S Trevor, *Textile Recorder* 69, 91, February, 1952.

Although the technology of lithium and its compounds was still relatively unknown a few years ago, large quantities of lithium metal and lithium compounds are today finding valuable applications in many industries, while the use of certain of these compounds would appear to offer distinct possibilities for the processing of textiles.

Many of the inorganic salts of lithium purified, dried and stored in the crystalresemble salts of the alkaline earth metals in chemical behavior. Thus the hydroxide is a strong base, similar to those of sodium and potassium, and the monohydrate can be used in the preparation of lithium soaps, greases and waxes, some of which are recommended as new ingredients of waterproofing compositions for proofing textile materials.

Lithium hypochlorite, made by the chlorination of lithium hydroxide, has created a good deal of interest as a textile bleach. It appears to offer certain practical advantages over other alkali hypochlorites. For example, it can be line state without fear of deterioration, and is quite stable to both air and moisture. This is in marked contrast to sodium hypochlorite.

Lithium derivatives of alizarine and anthraquinone wool dyes have greater solubility than the corresponding sodium salts. For example, one dark blue lithium-based dye was found to be water-soluble to the extent of 20 parts per liter of boiling water, compared with only 4 parts per liter for the corresponding sodium salt.

Patents covering these various applications, and others, are cited by the author. —WHC

Book Reviews

A Symposium on Developments in Applied Chemistry

Phi Lambda Upsilon, Dept of Chemistry
Pennsylvania State College
State College, Pennsylvania
(1951) Price $2.00

Five distinct essays by five different lecturers at the silver American Priestley Lectures are included in this book dealing with the historical concept of the nature of acids, applied household chemistry, the future of biochemistry, developments in glass technology and ceramics, and physical separational processes.

The section on "The Contributions and Potentialities of Household Chemistry" is a most interesting one, commencing with the advent of household chemistry in the days of Priestley, Scheele, and Lavoisier to the present day and to thoughts of the future. This article illustrates the importance of household chemistry, which paved the way for the introduction of a Home Economics curriculum at the beginning of the twentieth century. The important field of detergency was studied as a separate division of science in the 1880's and in 1919 research in textiles, textile chemistry, and detergency began on a small scale. These various advances to the present day are illustrated and bibliographies given. This article shows what can be done in the field of applied science while making a permanent contribution to science.—H B

Handbook of Dangerous Materials

N Irving Sax, assisted by W W Schultz and M J O'Herin
viii — 848 pages. Price: $15.00
Reinhold Publishing Co, New York

The preface states, "The purpose of this book is to present between two covers a digest of the available literature concerning the hazardous properties of some 5000 materials".

The object has been attained in an admirable manner. Materials are arranged alphabetically, with the following information given: maximum allowable concentration in air, explosive limits, hazardous properties, treatment and antidotes, storage and handling, synonyms, formula and physical properties, shipping regulations.

There is some cross referencing in the body of the listing; all synonyms appear to be listed in the index.

The reader will be surprised to find certain substances listed as hazardous materials. For instance, the textile chemist would scarcely consider acetate rayon a hazardous material, but it is listed on page 1. Money is also a hazard (due to the ink). The Bureau of Internal Revenue is doing its best to minimize this danger.

Following the section on General Chemicals are sections on Explosives (including chapters on storage and on destruction of unwanted explosives), Fungus Diseases and Fungicides, Radiation and Radiation Hazards, and the complete text of Interstate Commerce Commission Shipping Tariff.

All in all, an excellent book and one which should be available to those who must handle, store, or ship any quantities of chemicals.—W G C

The Pectic Substances

Z I Kertesz
Interscience Publishers, Inc, New York
(1951)

The author has succeeded in tying together the loose ends of the scattered information on pectic substances in one book, which serves the dual purpose of aiding those already in the field of pectic substances and also those who wish to utilize this information for their own particular needs.

The author has divided his book into five main complete sections dealing with the chemistry, botany, biochemistry, manufacture, and functions and applications of pectic substances.

At the beginning of the book the problem of the ambiguous nomenclature of the various pectic substances has been handled nicely considering the difficulty of renaming substances, the names of which have been carried down a number of years. The section on the chemistry includes many qualitative and quantitative methods of analyses. Fifty different plants are discussed in the botanical section. The section on biochemistry is devoted to enzymes and the separation of enzymes is briefly discussed. The section on the manufacture of pectic substances discusses briefly the development of the pectin industry and rather fully the more important commercial pectins including government regulations. The final section on the functions and applications of pectic substances and pectic enzymes relates to such applications as the use of pectins in wound treatment, as a hemostatic agent, and a blood plasma substitute and the role of pectic enzymes in retting of textile fibers, the fermentation of tobacco, tea, cocoa and coffee beans, and plant diseases.

"The Pectic Substances" has a comprehensive bibliography of over two thousand references. It should be a useful reference to those in the field and is also written so that newcomers interested in the field should have no major difficulty in absorbing the information brought forth.—H B

ASTM Standards on Textile Materials (with Related Information)

ASTM Committee D-13 (Textile Materials)
American Society for Testing Materials
1916 Race Street, Philadelphia 3, Pa
612 pages; paper covered; $5.00
October, 1951

The October, 1951, edition of this compilation includes eighty-eight specifications in their latest form, test methods, and tolerances developed by ASTM Committee D-13 on Textile Materials.

Standards cover: asbestos, bast and leaf fibers, cotton, glass textiles, rayon, silk, wool, pile fabrics (carpets), felt; and general fibers, fabrics, yarns, threads and cordage. Qualitative identification of fibers and finishing agents, and quantitative analysis of fiber blends are also covered. Most of the chemical techniques given in these sections are weak; better methods of chemical identification and chemical determination are available elsewhere.

General test methods cover testing machines, humidity, and interlaboratory testing. There are also tests on stretch and snag resistance of hosiery. Included for the first time are very comprehensive tentative methods of test for resistance to abrasion of textile fabrics, with numerous illustrations.

(Continued on Page 373)

Proceedings of the
American Association of Textile Chemists and Colorists

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Editor of Proceedings: Carl Z Draves, 30 Lahey St, New Hyde Park, N Y

June 9, 1952

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CALENDAR

COUNCIL
June 13 (New York); September 12 (Philadelphia); November 6 (Boston)

GENERAL RESEARCH COMMITTEE
(See Council dates)

NATIONAL CONVENTIONS
November 6-8, 1952 (Hotel Statler, Boston); September 17-19, 1953 (Hotel Conrad Hilton, Chicago); 1954 (Atlanta, Ga).

HUDSON-MOHAWK SECTION
June 20 (Annual Outing).

MID-WEST SECTION
June 14 (Lake Lawn Lodge, Delavan, Wis); October 4 (Hotel Bismarck, Chicago).

NEW YORK SECTION
June 13 (Outing, North Jersey Country Club, Wayne, N J).

NORTHERN NEW ENGLAND SECTION
December 6 (Annual Meeting, Lowell Textile Institute).

PHILADELPHIA SECTION
June 13 (Outing, Lu Lu Temple Country Club, North Hills, Pa).

PIEDMONT SECTION
Sept 13 (Hotel Charlotte, Charlotte, N C).

RHODE ISLAND SECTION
Oct 24 (Providence Engineering Society); December 5 (Annual Meeting, Sheraton-Biltmore, Providence, R I).

SOUTH CENTRAL SECTION
Aug 22-23 (Outing, Chattanooga Golf & Country Club); December 6 (Patten Hotel).

SOUTHEASTERN SECTION
Sept. 13 (Biltmore Hotel, Atlanta).

WESTERN NEW ENGLAND SECTION
June 20 (Outing); Oct 3, Nov 14 and Dec 12 (Rapp's Restaurant, Shelton, Conn).

EMPLOYMENT REGISTER

This column is open for two insertions per year, per member, without charge. Blanks can be obtained from, and filed with, the Secretary of the Association, Lowell Textile Institute, Lowell, Mass. It is understood that these will be open to inspection by prospective employers who can obtain further information from the Secretary.

HOTEL RESERVATIONS FOR 1952 CONVENTION

(1) Regular hotel reservations will be handled solely through a Convention Housing Bureau. Adequate accommodations will be available. Early in September, each member of the Association shall receive complete information on the subject of hotel reservations, rates, etc, plus a card on which the desired accommodations can be specified.

(2) Members desiring suites or reception rooms should communicate directly with the hotel, since these will not be handled by the Convention Housing Bureau. To obtain these latter accommodations, it is suggested that the following hotels be contacted:

Hotel Statler
Boston 17, Massachusetts

Hotel Bradford
Boston 16, Massachusetts

Sheraton Plaza
Boston 16, Massachusetts

Parker House
Boston 7, Massachusetts

Hotel Touraine
Boston 16, Massachusetts

OTHER EVENTS

AMERICAN CHEMICAL SOCIETY
7th National Chemical Exposition, Sept 9-13, Chicago Coliseum, Chicago, Ill. This will include the 2nd International Art Exhibit.

AMERICAN OIL CHEMISTS SOCIETY
Short Course industrial trips, July 8-9, 10-11.

AMERICAN SOCIETY FOR TESTING MATERIALS
Annual Meeting, June 23-27, 1952, New York. N Y. (The biennial Apparatus and Photographic Exhibits will be held in conjunction with this meeting).
1953 Annual Meeting, June 29-July 3, Chalfonte-Haddon Hall, Atlantic City, N J.

AMERICAN STANDARDS ASSOCIATION
3rd National Standardization Conference, Sept 8-10, Museum of Science and Industry, Chicago, Ill.
34th Annual Meeting, November 19, Waldorf-Astoria, New York, N Y.

AMERICAN TEXTILE MACHINERY ASSOCIATION
Exhibit of American Textile Machinery, April 26-May 1, 1954, Atlantic City Exhibition Hall. Atlantic City, N J.

CANADIAN TEXTILE SEMINAR
September 11-13, Queen's University, Kingston, Ont.

CHEMICAL SPECIALTIES MANUFACTURERS ASSOCIATION
38th Midyear Meeting, June 9-10, Sheraton-Plaza Hotel, Boston, Mass.

FIBER SOCIETY
Sept 10-11 (Princeton, N J).

INTERNATIONAL COTTON AND RAYON EXHIBITION
Sept 27-Oct 12, Busto Arsizio, Italy.

INTERNATIONAL ORGANIZATION for STANDARDIZATION
Meeting of Technical Committee 38 (Textiles), Subcommittees 2 (Shrinkage of Fabrics in Washing) and 6 (Fiber Testing)—June 13, 14 and 16, Columbia University, New York, N Y.

LEIPZIG FAIR
September 7-17, Leipzig, Germany.

NATIONAL ASSOCIATION OF HOSIERY MANUFACTURERS
41st Knitting Arts Exhibition, April 27-May 1, 1953, Atlantic City Auditorium, Atlantic City, N J.

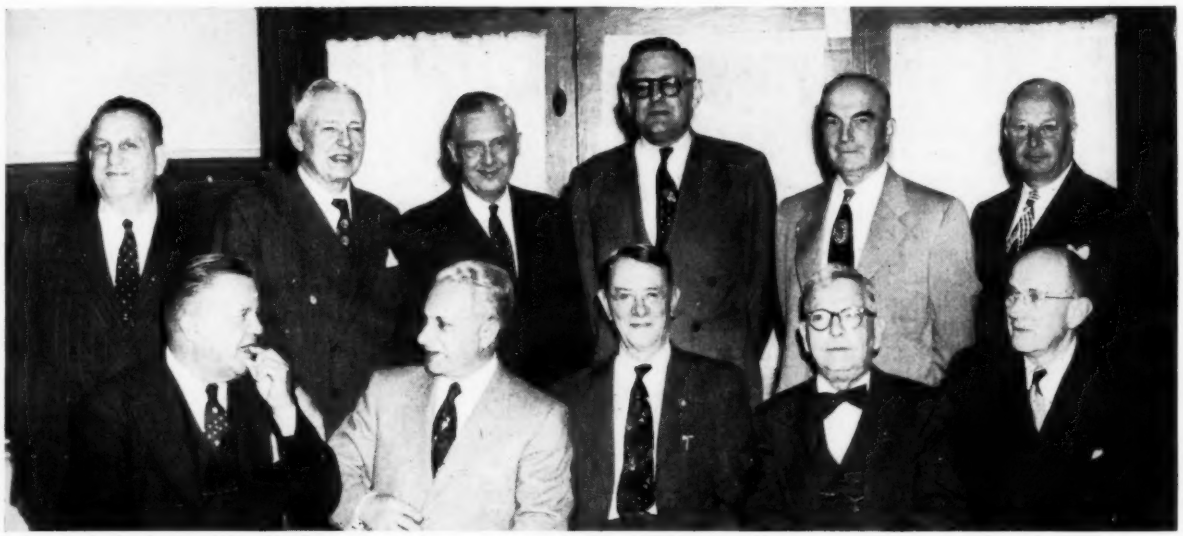
NEW YORK BOARD OF TRADE (DCAT)
26th Annual Meeting: September 25-28, Pocono Manor Inn, Pocono Manor, Pa.
27th Annual Drug, Chemical and Allied Trades Dinner, March 5 (1953), Waldorf-Astoria, New York, N Y.

TEXTILE RESEARCH INSTITUTE
23rd Annual Meeting, Nov. 17-18, Hotel Commodore, New York, N. Y.

TEXTILE WORKSHOP
June 16-July 25, Lowell Textile Institute, Lowell, Mass.

1952 NATIONAL CONVENTION
"TEXTILE DYEING & FINISHING EXPOSITION"
NOVEMBER 6-8
HOTEL STATLER, BOSTON, MASS.

PAST CHAIRMEN ASSEMBLE AT 30TH ANNIVERSARY CELEBRATION, N. Y. SECTION



Active members of the AATCC who have served as past chairmen of the New York Section assembled at the Section's 30th Anniversary Celebration on May 16th at Kohler's Swiss Chalet, Rochelle Park, N J.
Seated (l to r): Henry F Herrmann, Louis S Zisman, P J Wood, Daniel P Knowland, Harry R Tisdale.
Standing (l to r): George L Baxter, Herman E Hager, Charles W Dorn, Paul J Luck, J E Meili, Patrick J Kennedy.

30th Anniversary Celebration of New York Section

May 16, 1952
Kohler's Swiss Chalet, Rochelle Park, N J

THE New York Section celebrated the 30th anniversary of its founding at a dinner meeting held on Friday evening, May 16th, at Kohler's Swiss Chalet, Rochelle Park, N J. A short business session preceded the celebration at which the following officers were elected:

Chairman — Weldon G Helmus, Fair Lawn Finishing Co

Vice-Chairman — John H Hennessey, General Dyestuff Corp

Treasurer — George A Jonic, Calco Chemical Division, American Cyanamid Co

Secretary—Norman A Johnson, *American Dyestuff Reporter*

Councilor—James J Marshall, American Aniline Products, Inc

Patrick J Kennedy, Chairman of the Nominating Committee, presented the above slate and all were unanimously elected. Elections become effective August 1st with the exception of Councilor which becomes effective January 1st. The New York Section, through increased membership, is now entitled to seven representatives on the National Council. The retiring treasurer reported cash balance as of May 15, 1952 of $1,676.08. Ernest J Gsell, Outing Chairman, reported on plans for the June 13th affair.

For the anniversary celebration Arthur R Wachter of American Viscose Corp served as master of ceremonies and introduced each of the past chairmen present by divulging little known facts of their past behavior and they responded in turn. All of the living past chairmen of the Section who are still members of AATCC were present with the exception of Dr Elvin H Killheffer, second chairman who served in 1923 and 1924, and Samuel L Hayes, who served in 1927 and 1928. Those introduced by Mr Wachter and the years in which they served were:

P J Wood, Royce Chemical Co, 1922-23

Daniel P Knowland, Geigy Co, Inc, 1928-29

Henry F Herrmann, General Dyestuff Corp, 1932-34

Ephraim Freedman, R H Macy Co, 1934-36

George L Baxter, Bradford Dyeing Association, 1936-38

Louis S Zisman, Fabric Chemical Co, 1938-40

J E Meili, Consultant, 1940-41

Harry R Tisdale, American Dyewood Co, 1941-42

Patrick J Kennedy, E I du Pont de Nemours & Co, Inc, 1942-44

Herman E Hager, General Dyestuff Corp, 1946-48

Charles W Dorn, J C Penney Co, 1948-50

Paul J Luck, Calco Chemical Division, American Cyanamid Co, 1950-52

Others seated at the head table in addition to officers and past chairmen were: Leonard S Little, Chairman of the General Research Committee, Ralph M Fischer, Sectional Councilor, Dr Eugene W K Schwarz, Chairman of the Section Research Advisory Committee, John J Sokolinski, Charter Member and Past Sectional Treasurer, J Robert Bonnar, former Vice-President, M Antoinette Falcone, Vice-Chairman of the Sectional Membership Committee, Henry L Young, Sectional Councilor, Dr Harold W Stiegler, Director of Research, Kenneth A Howry, Chairman of Sectional Publicity Committee, Carl H Brubaker, Sectional Councilor, and Dr Carl Z Draves, Past President. Representatives from the Philadelphia Section were Arthur W Etchells, Central Atlantic Regional Vice-President, and Prof Percival Theel, Chairman of the Publications Committee.

An excellent steak or lobster dinner was served to the 250 present and George Baxter entertained with a few vocal selections.

Respectfully submitted,
NORMAN A JOHNSON, *Secretary*

Rhode Island Section——

CONTINUOUS FIBER DYEING*

S H WILLIAMS
General Dyestuff Corporation

INTRODUCTION

THE dyeing of fibers in stock form represents one of the oldest practices of coloring textiles. Batch dyeing of cotton raw stock still lends itself to many manufacturing processes, although much less stock dyeing of cotton is done today than yarn and piece dyeing. Large quantities of wool and various cut staples, however, are still processed and dyed in stock form by batch procedures.

The idea of dyeing fibers continuously rather than by batch methods is certainly not new. The continuous dyeing of both wool and cotton stock has been carried out in the past with limited degrees of success. To our knowledge, however, past attempts have not been sufficiently successful that the textile industry could generally adopt any continuous method. Believing there was a need for further refinement of techniques, we approached this problem from an angle which we thought would prove that the continuous dyeing and treatment of fibers can be made practical.

The textile industry as a whole has been somewhat slower than other industries in the acceptance of new practices. A quick look at textile mills, however, does indicate that our most progressive concerns are employing the majority of the newest developments that fit their requirements. In fact, many textile mills have made a great deal of progress during the past fifteen years in the continuous processing and dyeing of cloth. But, as the application of such principles to fiber processing and dyeing had not yet been made, it was our opinion that a mechanism and process for handling fibers continuously was long overdue. The General Dyestuff Corporation has therefore combined its skill in dye application with the engineering knowledge and skills of the Morrison Machine Company to produce a mechanism by which the principles already established for cloth could be applied to the continuous processing and dyeing of fibers. This work, which we are reporting upon today, has been under active development since 1944.

S H Williams

The inventor of the Williams Unit for continuous piece-goods dyeing, who is also the inventor of the hot-oil process of continuous dyeing, now presents a description of his latest invention, the Williams Continuous Fiber-Processing Machine. This expert in continuous fabric dyeing has developed a mechanism by which stock, staple fibers, slubbing, top, sliver, or nonwoven fabrics of different fibers can likewise be dyed successfully by continuous methods to obtain level, well-penetrated, well-fixed dyeings with minimum manipulation of the fibers.

In the operation of the machine the textile material is conveyed through a well unit much like the Williams piece-goods unit while it is held in the form of a thin sheet between two mesh belts. The relatively small volume of processing or dyeing liquor in a well unit is contained in the narrow slot through which the sheet of fiber stock travels. Sufficient turbulence to ensure thorough penetration is brought about by return passage, to the front of the machine, of the lower mesh belt through the same liquor space but in an opposite direction to the flow of stock. Passage time through one unit is controllable from 10 to 90 seconds. Outside the machine, sprays are provided by which the stock can be rinsed with cold or hot fresh water or with chemical solutions. Well units, pairs of squeeze rolls, spray units and conveyor belts can be arranged in any suitable sequence to meet the needs of any complicated as well as simple dyeing or wet-processing procedure when an immersion time of about 30 seconds in each well unit is sufficient to effect the required result.

The author indicates the experience that he has already had in dyeing and processing various fibers and emphasizes future possible uses of his new apparatus for treating both old natural and new man-made and synthetic fibers in various forms.

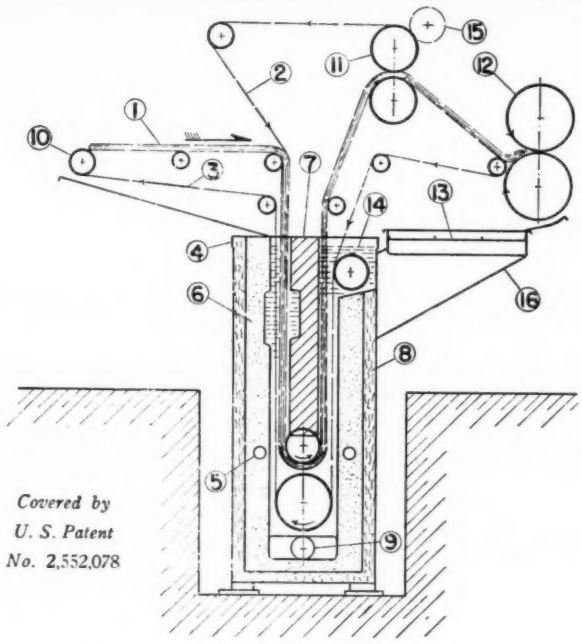
The importance of a mechanism for handling fibers continuously can be appreciated after a consideration of how rapidly man-made fibers are being developed at this particular stage of textile development. All these newer fibers will play an important part in the future of our textiles, and many new fabrics will be created because of their discovery. Blends of staples of old and new fibers will be developed to enhance the quality and characteristics and also to lower the costs, of the many fabrics we shall use in the future. With the advent of each new fiber, we are confronted with the problem of chemically treating and dyeing that fiber practically. Batch methods tend to limit the possibilities of such development because of limitations in the cost and expediency of carrying out the variety of processing steps necessary for all fibers with the presently available types of machinery. Our new mechanism should therefore not only be useful for the processing of the old natural fibers, but it should be especially useful for handling the many new fibers, many of which will have to be processed and dyed separately before being blended.

The development of a mechanism in which either old or new fibers can be processed and dyed continuously is timely in that we now not only feel the economic pressure to realize the savings in labor, dyes, chemicals and steam from the use of continuous methods, but we now understand better from our successful and long experience with cloth how to get satisfactory chemical and dyeing results in the short periods of time characteristic of continuous methods. In this new equipment fibers can be processed and dyed at a steady and productive rate of speed with exact and automatic control of times and temperatures and with superior and more uniform final results in comparison with batch methods.

WILLIAMS CONTINUOUS FIBER-PROCESSING MACHINE

GENERAL PRINCIPLES——The general purpose of the Williams Continuous Fiber-Processing Machine is to deliver

* Presented before the Rhode Island Section in Providence, R I, on November 16, 1951.



1 *Fibers*
2 *Top Mesh Belt*
3 *Lower Mesh Belt*
4 *Tank*
5 *Steam Inlet*
6 *Steam Chest*
7 *Removable Baffle*
8 *Insulation*
9 *Drain*
10 *Tightener Roll*
11 *Draw Roll Nip*
12 *5-Ton Nip*
13 *Lint Screens*
14 *Liquor Level*
15 *Belt Brush*
16 *Dye Return Pan*

Figure 1

loose fibers (1 in Figure 1) between two stainless-steel flexible belts (2 and 3 in Fig 1), to convey the fibers constrained between the belts in a narrow sheet through a treating solution (under 14 in Fig 1), and then to deliver the fibers out of the processing solution to the nip of two squeeze rolls (12 in Fig 1). Beyond the rolls the fibers again are delivered onto a similar conveyor belt to be carried in the air past nozzles (16 in Fig 2), which allow appropriate water or solutions to be sprayed onto the sheet of fibers. The latter are then delivered again into the nip of a pair of rolls (second 12 from left in Fig 2). A great advantage of this arrangement is that processing units and rinsing units can be arranged in tandem to provide whatever succession of passages through any number of desired wet processing steps of any kind, including dyeing, with any number of spray rinses and heavy squeezes between.

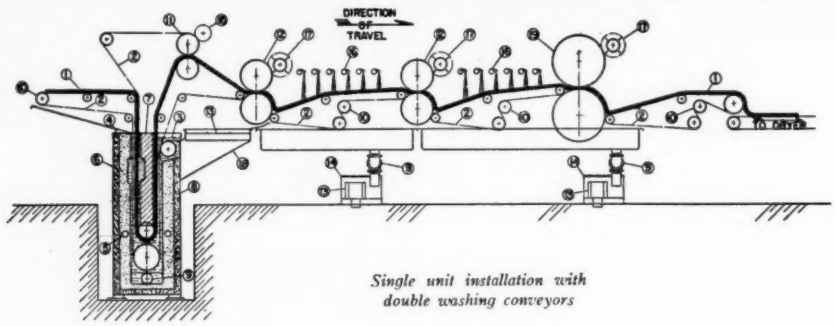
DETAILS——In Figure 1, when stock or fiber (1) is carried between the conveyor belts marked (2) and (3) through the processing solution in the unit, it passes through draw rolls (11) and is delivered at the nip of squeeze rolls (12), where it is squeezed with a pressure of 5 tons on the rolls. Excess solution falls onto the screen (13) and extending apron and is conducted back to the unit by the pipes marked (16). When the lower conveyor belt (3) returns through the tank of the unit, it passes through the solution below the conveyed stock or fiber in an opposite direction and thus causes a flow of treating solution through the stock or fiber. The volume of processing liquor in the machine is effectively reduced by insertion of a removable spacer (7), often called a baffle. The volume of processing liquor in a unit carrying a 40-inch sheet of stock or fiber is about 50 gallons at the level indicated by (14) when the unit is in operation. The spacer, or baffle (7), must be in position for operation of the machine as the rollers under which the mesh belts carrying the sheet of processed stock and also the roller that returns the lower conveyor belt (3) through the bath on its return to the front of the machine are mounted on the bottom of the spacer or baffle.

Feed tanks, not shown in the drawing, are supplied to hold solutions, which are fed steadily to the machine in the same manner as for any continuous operation. If recirculation of processing liquor is necessary, a pump may be installed to draw off solution at point (9) and to return it at point (14).

TYPICAL SINGLE-UNIT INSTALLATION——The simple single-unit installation shown in Figure 1 may be used for a number of chemical and dyeing operations that require no additional rinsing or aftertreatment before drying of the fiber stock. Examples of uses for this simple installation include mildew proofing, water proofing, tinting or dyeing where no fastness to washing is required. Because of the small volume of the unit, it is practical to work with impregnating solutions that have a high cost per gallon.

SINGLE UNIT WITH DOUBLE SPRAY WASHING——In Figure 2 is shown a single unit with a double spray-washing conveyor belt arrangement in tandem after the unit. The sheet of fiber stock is delivered from the squeeze rolls at (12) onto a single mesh conveyor belt (2), which carries the material under the first set of spray nozzles at (16), normally carrying cold water, and delivers it to another pair of squeeze rolls. After passage on another single mesh conveyor belt under a second set of spray nozzles, normally carrying hot water, the sheet of fiber stock in Figure 2 is delivered to a pair of final squeeze rolls with a 15-ton pressure, from which the stock is conducted to a dryer. It is obvious that the number of sets of spray nozzles and squeeze rolls may be varied for special purposes from the arrangement shown in Figure 2 and that the temperature of the spray water may be varied at will. The particular arrangement shown in Figure 2 is one typically employed for the application of direct or sulfur dyes.

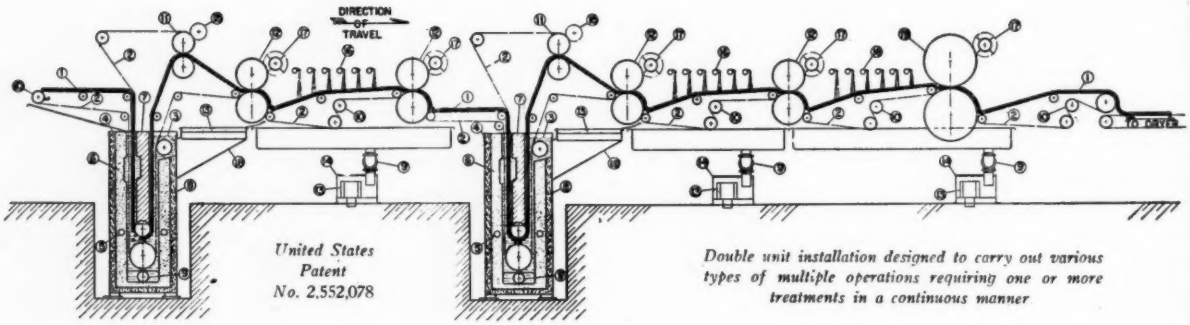
DOUBLE UNIT WITH SINGLE INTERMEDIATE SPRAY WASHING AND DOUBLE FINAL SPRAY WASHING——The double-unit installation with single intermediate spray washing and double final spray washing, illustrated in Figure 3, is more versatile for carrying out more complicated procedures of dyeing or processing. Further immersion units and spay-washing units may be connected in tandem in the manner illustrated by Figure 3 to get whatever combination of processing steps is required. From the last squeeze rolls shown by (19) in Figure 3, the sheet of stock can be carried by a belt directly through a dryer. Installations with a number of units in line are operated by DC drives with variable speeds between nips so as to apply proper tension to the sheet of stock as it



Single unit installation with double washing conveyors

1 Fibers
2 Mesh Conveyor Belt
3 Liquor Level
4 Tank
5 Steam Inlet
6 Steam Chest
7 Removable Baffle
8 Insulation
9 Drain
10 Tightener Roll
11 Draw Roll Nip
12 5-Ton Nip
13 Lint Screens
14 Lint Tank
15 Belt Brush
16 Spray Pipes
17 Roll Wiper
18 Dye Return Pan
19 15-Ton Nip

Figure 2



United States Patent No. 2,552,078

Double unit installation designed to carry out various types of multiple operations requiring one or more treatments in a continuous manner

Figure 3

progresses through the range.

HOPPER FEEDS——For dyeing loose fibers, hopper-type feeders may be installed to feed stock at a uniform rate to the top of the first entering conveyor belt. By use of the automatic feeder, stock can therefore be carried through any number of processing or dyeing steps, through a dryer and to a baling press without any manual intervention at all.

OTHER TEXTILE FORMS——Besides loose fibers in stock or lap form, fibers in the form of tow, slubbing, or sliver can also be wet-processed in the equipment described here. Nonwoven or other fabrics with no wet strength are likewise suitably carried along by the mesh conveyor belt without undue distortion.

USES

By use of a suitable number and arrangement of immersion units and sets of sprays, textile materials in loose or at least in a form without tensile strength can be subjected to many of the continuous processing and dyeing methods, and especially to the flash dyeing methods, that have been so successfully developed in recent years for piece goods. The units, mesh conveyor belts and other parts that come in contact with immersion or spraying solutions are constructed from high-quality preferably, 18-8-S-Mo) stainless steel so as satisfactorily to withstand most of the acid, alkaline, oxidizing or reducing solutions that are employed in wet processing and dyeing. The drives are controllable so that the amount of material processed per hour can be varied between 250 and 3000 lb, and the duration of immersion in each well unit between 10 and 90 seconds. Research is still necessary to develop successful flash methods for longer procedures of processing or dyeing that cannot now be brought within the compass of time practicable for a continuous range. A typical example of a long procedure that has not yet been shortened for continuous application is the chrome dyeing of wool.

VISCOSE-RAYON STAPLE —— The difficulties arising from the chemical treatment or dyeing of viscose staple in pressure machines because the fiber swells in strong alkaline solutions are well known. On our new machine any swelling of fiber offers no bar whatsoever to adequate circulation of liquor through the stock. The coacting conveyors carrying the staple through the baths are tension-controlled and allow for the swelling of fibers to take place in travel through the liquor without matting of fibers or channeling of liquor flow. Vat dyes, naphthols, sulfur dyes and directs can therefore be applied on staple in this equipment with excellent results. The cost of continuous application of naphthols is cut approximately in half in both dye and chemical cost over batch methods. With dyestuffs that have low exhaustion, the saving in dye is considerable, the saving for sulfurs being about 33% over batch application. Other substantial savings, which together may amount to more than those in dyes and chemicals, also follow, including especially steam and labor.

TOW DYEING——The development of the Pacific Converter has created wide interest in the processing of synthetic fibers in tow form. The many experiments

that we have carried out in dyeing tow have been very promising and indicate that tow dyeing will prove successful for many synthetic fibers. The tow is carried through the machine by the conveyor in the same manner as stock without exertion of tension on either individual fibers or tow mass. Vat, sulfur, naphthol, and direct dyes have already been satisfactorily applied experimentally on viscose tow in our machine, samples of dyed viscose tow being on exhibit here tonight for your inspection. Tow of Vicara protein fiber has been dyed with acid colors in a two-bath procedure, the dye being put on in the first unit and fixed in an acid bath at a high temperature in the second unit.

VAT DYES ON WOOL——In spite of much experimental work over the country in the application of anthraquinone vat dyes on wool, such application has not apparently become general for civilian work because of the harshening effect on the wool fiber of the alkali necessary in dyeing anthraquinones. In our machine, on the other hand, the accessibility of the fiber in stock or slubbing form to the dye liquor permits the attainment of penetration and exhaustion of the dye on the fiber in seconds compared with minutes necessary for dyeing piece goods or for dyeing stock or top in circulating machines. The very short time of exposure of the fiber should limit the degration of fiber by alkali and permit wider application of anthraquinone vats on wool. The samples in our exhibit were dyed with anthraquinone vats on wool stock with a 30-second immersion at 160° F in the presence of relatively high concentrations of caustic alkali. In batch dyeing it is necessary to use low alkali concentrations and to keep the temperatures low to avoid fiber damage. A lengthy dyeing cycle is then necessary to level out the dye through a compact batch of stock. In our mechanism, high temperature and high alkali concentration give quick exhaustion of dye and excellent fixation; easy and uniform accessibility of fiber to liquor at the same time gives excellent penetration and levelness.

Woolen and worsted mills that dye government shade OG 108 with anthraquinone vats recognize the technical difficulties and long procedure that are involved to meet specifications. The allowable working tolerances within which the few vat dyes permitted for OG 108 may be dyed with respect to alkali concentrations, temperature and time are so close that application on many machines is too dangerous to guarantee satisfactory results without fiber damage. Dyeing produced on the low side with respect to these three factors, even though safer as far as fiber damage is concerned, may wash down abnormally and show poor rubbing fastness. Samples of wool dyed with anthraquinone vat colors, including samples of shade OG 108, are available for your inspection. They were dyed as stock on our new range with an immersion time of 30 seconds.

HELINDON VAT DYES——Helindon vat dyes, which include those vat dyes that are applicable in conventional wool-dyeing equipment from a bath alkaline with only the very mild alkali, ammonia water, do not impair the handle of wool in conventional equipment at all. Helindon vat dyes are fully equal to chrome dyes in wet fastness and light fastness on wool and at the same time impair the handle of wool less. They have the advantage over acid dyes of having much better wet fastness, all displaying excellent (5) fastness to washing. Helindon dyeings on wool at the same time have mostly excellent light fastness. Although Helindon vat dyes normally cost somewhat more than simple acid or chrome dyes, they offer the advantages, for application in conventional wool-dyeing equipment, of shorter application time with important savings in both labor and steam. These advantages become most evident for light shades on men's wear when excellent fastness is necessary.

Helindons are especially suitable for application on our new equipment with attainment of the same quality of dyeing and with maintenance of the handle of the wool in the same degree as by batch methods with the advantage of higher production rates. A particular advantage of Helindon dyeing is the ease with which a formula can be established. And then, when a formula is once established, it can be so readily duplicated on a later occasion or on another continuous range. To match a shade, a commercial-sized unit is filled with dye liquor according to a laboratory recipe. Then a pound or half pound of wool stock or slubbing is run through the machine, finished, and dried. The formula is then changed, if necessary, and another small sample is run through. In a very short time and with a relatively insignificant quantity of fiber a reliable formula is established, and this formula is then continued in use to the end of the large-scale run.

COTTON RAW STOCK——The dyeing of raw cotton in either a pressure or a rotary machine involves much labor. Manual loading, unloading and extracting operations are cumbersome and time-consuming under the best conditions. Raw stock in a pressure machine, however carefully loaded, is usually unevenly dyed because of channeling. Unevenly dyed batches must then be blended to level out the unevenness. Another hazard in pressure dyeing is the filtering out of dye particles, hardwater deposits and scum on the stock because it acts as a filter. The use of clear, clean, soft water, water-softening agents and synthetic assistants are helpful, and yet, even under the best conditions, accumulations from the filtering action of the stock in dyeing constitute a problem in carding and spinning. The nature of the stock largely governs the readiness with which it can be satisfactorily packed to ensure circulation, low-grade cotton especially having a tendency to pack in such a way as to impede circulation and promote channeling, particularly with some types of dyestuffs.

While we have not run any large volume of cotton through a mill after it has been dyed in stock form on our continuous machine, a number of experimental runs have clearly indicated that cotton dyed continuously is much superior to cotton dyed comparable shades in pressure machines. A further advantage for maintenance of carding and spinning qualities of cotton stock is that it is not necessary for continuous dyeing in our new equipment to remove waxes and pectins, which improve fiber lubricity; the use of a good penetrant permits elimination of boiling out before continuous dyeing. As far as depth of shade is concerned, deep blacks have been dyed continuously in our machine with vat dyes.

JUTE——The dyeing of jute in yarn form for some purposes, such as rug backs, was superseded by the staining of jute stock on a softener by spraying with 20 to 28% of an aqueous solution of acid dyes, direct dyes, or even basic dyes to obtain a colored effect that was far from solid. The dyeing of stock in a series of wool-scouring bowls, although it gave a solid result, was never very successful and was readily displaced by the padding of jute sliver with a hot aqueous solution of dyestuffs. The new equipment described here is ideally suited for dyeing jute sliver, and should give dyeings far superior in fixation to those obtained from a simple padding operation.

WOOL SCOURING——A large number of experiments have been carried out on various grades of wool to determine whether or not wool could be properly scoured in our machines. These preliminary trials have indicated that the wool meets the usual standards for scoured wool. No matting or tangling of fibers occurs in the wool during passage because it remains held in a thin sheet on its way

through the machine, and yet, the very thinness of this sheet and the rapidity of flow of liquor permit uniform action on all fibers. The short time of contact of wool with solution, which is permissible because of the free accessibility of every fiber to processing solution, also permits the use of higher temperatures and stronger detergent solutions. Further studies are being conducted with raw wool.

OPERATIONAL ADVANTAGES—— The advantage already described under Helindons of striking off shades with as little as a half pound of stock should interest the dyers of other fibers as well as wool. In the dyeing of staple fiber or stock, the shade may well be adjusted with feeds during the run if the shade is not too far off. Later blending, which is normal for such stocks, will take care of any slight variations in shade while the formula is being adjusted. A further advantage is that the small volume of liquor contained in each well unit means that the machine is especially adapted to reasonably short as well as long runs. By an arrangement of units in line with intermediate washing conveyors, any complicated series of wet operations can be carried out in sequence without any intermediate handling and with automatic delivery of stock to a dryer. The general versatility of the machine for many uses has already been proved by countless trials.

LIMITATIONS——The equipment described here does have some limitations in use. In the first place, fibers must be fed to the machine in a proper physical condition—open and free, not dense or matted—if dyeings superior in uniformity and penetration to stock dyeings made in an ordinary circulating machine are to be made. Textile processing or dyeing steps requiring long cycles, such as chrome dyeing on wool, cannot be made until satisfactory flash methods are developed. As the volume of liquor (about 50 gallons) is much larger than a shallow pad box, equilibrium conditions are not often established immediately if the feeding liquor is the same as the starting liquor. It is therefore sometimes a little troublesome to establish a starting formula and a feeding formula that give exactly the same shade without any tapering or buildup at all over the first couple hundred pounds of stock. Such formulas can of course be reliably worked out only from practical mill runs. When practical running formulas are once established, however, our experience has shown that they are quite reliable for use again for the same type of stock in the same or similar arrangements of units.

Minutes of Piedmont Section Research Committee Meeting

April 26, 1952

THE Research Committee of the Piedmont Section met at Clemson College, South Carolina, on Saturday April 26, 1952. Dr H Y Jennings, Chairman, presided. In addition to a quorum of the regular committee, many members of the section attended. The total attendance was approximately seventy.

The minutes of the previous meeting at Winston Salem, were read and approved.

The first topic of discussion was the current intersectional prize paper now in preparation on the subject of some observations on the conditioning of resin treated rayons. The Secretary discussed data accumulated in past months in the Burlington Mills Laboratory and that accumulated by Mr Rutherford and his group at North Carolina State College. Some additional work will be done in the coming weeks on rayons and Dr Jennings will pursue a similar study on cotton dress goods. There was widespread discussion of this subject and several suggestions from the floor. The committee was assured that an interesting paper would be ready for presentation at the next national meeting.

Neal Truslow headed the discussion on the proposed future paper on tear testing. The previous decisions of the committee were reviewed and work will be underway shortly on this problem. It was suggested that the addition of a viscose/acetate blend suiting be added to the fabrics already under consideration. On the other hand it was thought that the problem would be made too cumbersome if too many variables were introduced.

Professor Lindsay led the discussion on the proposed paper on antistatic evaluation and spoke of the work now going on at Clemson as well as the work of the national association, which is presently undertaking correlation study on static evaluation equipment. Professor Lindsay's attack on this paper will be the first to evaluate the machines and second to evaluate materials; in other words, reliable methods must be available before comparisons of type of materials can be made.

The regular business of the Research Committee being completed, Dr Jennings closed the session and turned the floor over to R H Souther for a discussion of stream pollution problems. Mr Souther reviewed the work reported at the Winston-Salem meeting and discussed some later work relating to the reduction of the pollution problem by conservation of chemicals in dyeing operations. He reported that information obtained by special instruments developed in their laboratories for redox evaluation of vat and sulfur dyebaths showed that both color and B O D of stream wastes could be reduced by either changing dyestuff itself or changing the method of dyeing. In one mill experiment, the addition of another exhausting chemical in dye bath reduced the sulfide content about 35 per cent in dye waste liquor, decreased alkalinity 60 per cent, and the chlorine demand of waste liquor dropped from 6500 to 300 ppm with only a slight drop (50 mv) in reduction potential at end of dyeing cycle. He also spoke of work in other sections as far as trade waste disposal is concerned.

Respectfully submitted,
FRANCIS K BURR,
Secretary, Research Committee

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Meeting Report— Hudson-Mohawk Section

April 3, 1952
Amsterdam, N Y

MEMBERS of the Hudson-Mohawk Section held a joint meeting with members of the Albany Section of the American Society for Quality Control on Thursday, April 3, 1952 at the Bigelow-Sanford Carpet Company, Amsterdam, New York. The Technical meeting was preceeded by guided tours through the dyeing, spinning, scouring, finishing, Axminister weaving and final inspection departments of the Amsterdam plant. Dinner followed in the plant cafeteria.

R R Jones, Quality Control Superintendent, Bigelow-Sanford Carpet Company, presented a paper entitled "Quality Improvement Methods", which placed special emphasis on quality-mindedness and promotion of quality improvement in the carpet industry. In addition, a John Q Quality movie prepared by the technical staff and quality control departments of Bigelow-Sanford, was shown.

Ninety-six members of the Section attended this meeting with a similar number from the Albany Section of the American Society for Quality Control.

Respectfully submitted,
WILLIAM A NELSON,
Secretary

30th Annual Convention
Auxiliaries and Testing Group——

ORGANIC COMPLEXING AGENTS IN TEXTILE PROCESSING*

JOHN J SINGER and FREDERICK C BERSWORTH

Bersworth Chemical Company
Framingham, Mass

J J Singer

This paper describes briefly the chemistry involved when metallic ions react with organic complexing agents. The use of Versene (ethylenediaminetetra-acetate sodium salt), Versene Fe-3, Versene Fe-3 Specific and Versene T by the textile processing industry. Among the uses described are the effects of sequestering agents on wool during the scouring process, the prevention and removal of iron stains from cottons during the mercerizing or kier-boil or caustic treatment, the use of organic complexing agents to stabilize peroxide bleach solutions and to prevent iron and hard water salt precipitation in hypochlorite bleaches. The effects of metal impurities in dye bath and their inactivation through the use of organic complexing agents are discussed in detail.

F C Bersworth

INTRODUCTION

ORGANIC complexing agents are widely used throughout the entire chemical industry. Their stability, versatility and efficiency have firmly established their use in chemical processing. The role played by complexing agents in textile processing is very important, and their use is becoming more and more widespread as time goes on.

The compounds in which we are primarily interested at the present time are the sodium salts of ethylenediaminetetra-acetic acid. These are now widely known under the trade-marked name of *Versene*. We are also interested in other polyamine carboxylic acid salts, known as *Versene Fe-3, Versene F-3 Specific* and *Versene T*. All these compounds are manufactured under patents owned by Frederick C Bersworth.

Before going into detail on the actual use of these materials let us first look into the chemistry of these organic complexing agents. More precise data have been accumulated on the salts of ethylenediaminetetra-acetic acid than on any of the other compounds. We will use this compound for example purposes, and will, because of its lengthy name, call it by its simple trade name of *Versene*.

Metallic ions are always present to some degree in practically all untreated process water. Those most common are calcium and magnesium. These cause water to be hard, but other ions, such as iron, copper, zinc, are often present as well. Calcium and magnesium cause trouble primarily because they react with soaps to form insoluble compounds, which are gummy and sticky. Iron, copper, zinc, and other metals are troublesome because they react with dyestuffs to form off-color shades. Copper and other metals catalyze the decomposition of peroxide bleach solutions. Iron causes staining in the kier boil and in mercerizing operation. It can create pinholes in the cloth during peroxide bleaching.

Versene reacts with these metal ions to form stable nonionic complex compounds, which completely change the chemical properties of the metal ions. Metal ions complexed by Versene cannot be precipitated by ordinary precipitating agents.

The equation given as follows shows the reaction between Versene and Calcium:

$$(NaO_2CCH_2)_2NCH_2CH_2N_2(CH_2CO_2Na)_2 + Ca^{++} \rightleftarrows \begin{matrix} NaOOCCH_2 \\ NaOOCCH_2 \end{matrix} \rangle NCH_2CH_2N \langle \begin{matrix} CH_2COONa \\ CH_2COONa \end{matrix}$$

The same reaction occurs with all divalent metals and with most other metals.

The metallic complex is, of course, in equilibrium with free metallic ions, but the reaction to the right that forms the metal complex salt greatly predominates. The actual concentration of free metallic ions is in practically every case lower than the value required by the solubility product relationship to cause precipitation. As a result, metals cannot be precipitated from the complex salt by common precipitating agents. In fact, insoluble metallic compounds are readily dissolved by Versene with the formation of the metal chelate and the sodium salt of the anion of the precipitating agent. The solution of common insoluble soap is a good example of this action. The chemical equation is as follows:

* Presented by Dr John J Singer in New York on October 19, 1951.

$Ca(soap)_2$ Insoluble	+	Na_4 Ver Soluble	→	Na_2 Ca Ver Soluble	+	2 Na soap Soluble

or as would occur in a dye bath

Fe (dye) Metal Lake	+	Na_4 Ver Soluble	→	Na_2 Fe Ver Soluble	+	Dye True Color

The versatility and efficiency of Versene are remarkable. But, as can be expected with any compound, it has its limitations. Versene is not an effective complexing agent for ferric iron in alkaline solutions. In acid solutions ferric iron is complexed by Versene to such an extent that iron contamination is lost when the pH is raised.

The iron complexing deficiency of Versene in alkaline solutions was overcome by the development of Versene Fe-3 Specific. This is the most effective and efficient iron-complexing agent known for use in the normal, measurable pH range. This compound is a carboxylated amine of different structure than Versene. It complexes copper, nickel and cobalt as well as iron but has no complexing power for calcium, magnesium or the other common metals. A mixture of Versene Fe-3 Specific and regular Versene is available for general all-round complexing power. This mixture is called Versene Fe-3.

Although Versene Fe-3 Specific is an effective complexing agent for iron between pH 3 and pH 12.5, it loses a great deal of its complexing power when the pH is further increased. It has practically no effectiveness in caustic solutions. Again, this drawback was overcome by further research and a new amino acid salt compound was developed. This is a very effective complexing agent for iron in dilute to concentrated caustic solutions. The compound is called *Versene T*.

Versene T is very effective in caustic solutions, but it has little complexing action towards iron in the normal pH range. It will, however, complex calcium, magnesium, and other common metal ions in much the same manner as Versene but less efficiently.

USES

Since each of these compounds has specific properties, the efficient utilization of these complexing agents requires judicious choices between the compounds or mixtures to be used.

These compounds are used by the textile industry in the following processes. Their uses will be discussed in some detail.

scouring
kier boil
mercerizing
bleaching (both peroxide and chlorite)
dyeing

SCOURING——The most readily apparent use of Versene salts is in the scouring operation as a water softener. Since large quantities of soap are often used, a water softener is vitally necessary in most localities. The polyphosphates, because of their low cost, are popular and, in many cases, cannot be replaced by Versene without increasing costs. Quite frequently, however, EDTA salts may be used more economically because of their stability and much greater efficiency per unit weight. At boiling temperatures polyphosphates revert to ordinary phosphate and slowly lose lime-sequestering power. An exact comparison of efficiency between Versene and the polyphosphates is quite difficult to make because of the fact that the complexing efficiency of the phosphate varies both with temperature and with the degree of water hardness. Another thing that makes a true comparison difficult is the fact that conventional tests use a soap foam to determine the end point of calcium repression tests. The soap indicator cannot differentiate between removal of calcium by precipitation of removal by sequestration.

In addition to its ability to complex and inactivate calcium and magnesium salts, Versene also inactivates any other metallic ions that are present and that are not complexed to any marked degree by the phosphates. When iron is present, Versene Fe-3 performs very nicely. The amount of Versene or Versene Fe-3 which should be used in any given scouring solution can be determined very readily from the hardness of the water used.

One fluid ounce of Versene will complex 36.4 grains of contained hardness and should be added accordingly. If water is once softened with Versene, the water is softened permanently. Elevated temperatures and alkaline solutions will not decompose the amino acid or the complex. If adequate quantities of Versene are used, no insoluble soap will be present in the wash solutions, and, if Versene-softened water is used as a rinse, the cloth will be completely free of insoluble soap or other metal salts and will dye more readily. Dye resists will be minimized if not completely eliminated.

If textiles are washed in solutions containing no Versene, the insoluble soap remaining on the fiber can be easily removed with a Versene rinse. One pound of dry Versene will dissolve one pound of insoluble calcium soap. Another interesting fact is that Versene will, when added to a washing solution, increase the solubility of high titer soaps. The amount necessary to increase this solubility is not entirely dependent on the hardness of the water since quantities of Versene smaller than the amount necessary for complete softening will increase solubility.

The solution of calcium and magnesium soaps by Versene is rapid and complete. After one treatment residual soap content is practically nil. A second treatment with Versene will produce no soap foam. Rinses using polyphosphates do not remove all the soap in one treatment, since the third polyphosphate rinse will still produce a noticeable soap foam; this indicates incomplete removal of insoluble soap by the first two rinses.

Versene has also proven itself useful when used with many synthetic detergents. With most of these compounds Versene exerts a synergistic effect by improving the inherent qualities of the detergent.

Another very important result obtained when Versene is used in the scouring solution is that wool cloth is softer and fluffier. The resiliency of the wool is much higher and the feel much softer than that now obtained with washing solutions containing high concentrations of soda ash and polyphosphates. There is little question but that, through the use of organic complexing agents, finer fabrics can be obtained.

KIER BOIL——The kier boil operation which involves boiling cotton cloth in caustic solutions of from 3 to 5% concentration is adversely affected by any iron which is present in the water, caustic, machinery or in the cloth itself. Any iron present precipitates as the hydroxide and is deposited on the cloth. The iron deposit causes stains, which are detrimental not only to whiteness and to any subsequent dyeing operation but also to peroxide bleach solutions. Heavy, localized deposits on cotton cloth catalyze the decomposition of peroxide to such an extent that oxycellulose is formed where iron is deposited. This oxidized cellulose has little strength and holes appear in the cloth. Since heavy deposits of iron can cause peroxide to burn holes in cotton, it is a logical assumption to say that any iron which is present will cause the formation of some oxycellulose with subsequent lowering in tensile strength of the cloth—even though not enough oxidation has occurred to be noticeable to the eye.

Until very recently the only way to remove these iron stains was by an acid treatment, which is expensive, troublesome and, to some extent, harmful to the

cloth.

A short time ago an organic complexing agent called Versene T was developed. This compound overcomes iron problems during kier boiling by complexing and dissolving insoluble iron compounds. The efficiency of this material is so remarkable that it warrants special consideration at this time.

As you know, if a solution of iron is added to alkaline solutions, a precipitate of iron hydroxide is formed. This precipitate is sticky, gelatinous and very insoluble. If the caustic is very concentrated a small amount of iron will dissolve with the formation of sodium ferrate. This compound is stable only in huge excesses of caustic and is precipitated as ferric hydroxide when the concentrated caustic is diluted. Most of the iron present as an impurity in commercial caustic is in solution as the ferrate.

If, however, a small quantity of Versene T is added to a dilute caustic solution, a considerable amount of iron may be added before precipitation occurs. If iron is added first to the caustic, the precipitated hydroxide will be dissolved when Versene T is added. Solution is rapid at low temperatures and practically instantaneous at elevated temperatures. The iron complex which is formed is colorless and iron is not precipitated when the caustic is diluted. One fluid ounce of Versene T will complex 36 grains of iron calculated as Fe_2O_3 in caustic solutions.

When Versene T is added to kier boil caustic solutions, all the iron present in the caustic or on the goods is dissolved. Since the iron is in a stable complex form, it can be removed in the rinse, leaving the cloth completely free of iron.

Since it is difficult to determine with any degree of accuracy the exact amount of iron contamination present, most users of Versene start with a concentration of 1 in 500; that is, one gallon of Versene T in every 500 gallons of caustic solution. This is a high enough concentration so that one can be assured that, under normal operating conditions, all of the iron has been complexed. Then, after establishing this initial Versene T level, the concentration is slowly reduced to the lowest level at which the iron contamination is completely removed. It is not recommended that the final level be too close to the border line because a fairly large variation in the iron concentration from day to day is to be expected.

It should also be mentioned that Versene T is inert towards metallic iron. It will, however, dissolve accumulated rust and iron corrosion residues. When Versene T is first used in any system, larger quantities than normal will be required until all corrosion residues which might be present are removed. Versene T may be used in any caustic solutions to control iron. It is just as effective in the continuous J-box systems as it is in the batch process. One very noticeable fact is that the equipment remains clear and free from scale and dirt deposits.

In addition to its complexing power for iron, Versene T also forms complexes with hard-water salts as well as with other common divalent metal ions, such as copper, nickel, or cobalt, in much the same way as the salts of Versene. It must be emphasized that Versene T is effective as an iron complexing agent only in caustic solutions. It is not effective on iron in the normal pH range up to pH 12.5. It will, however, complex other metals in this range as well as in caustic solutions.

In special instances where a processing solution is strongly caustic initially and is later neutralized to neutral or acid pH's, iron can be controlled by using a mixture of Versene T and Versene Fe-3 Specific. This latter compound is very effective as a complexing agent for iron in the pH range from 3 to 12.5. When these compounds are used together, the Versene T complexes the iron in the caustic solutions and the Versene Fe-3 Specific takes over when the caustic solution is neutralized.

MERCERIZING —— The same iron problems are encountered in the mercerizing process as are encountered in kier boiling. Iron contamination can be controlled with Versene T in exactly the same way as in the kier operation.

CAUSTIC RECOVERY——Any caustic recovery system will concentrate not only the caustic but also a good part of the iron which was in the water. If this iron is not inactivated or removed, a good deal of trouble may be encountered. The use of Versene T will completely eliminate any dangers from the iron impurity.

BLEACHING——Versene as well as Versene Fe-3 Specific have been used by many textile processors as an addition to their peroxide baths in order to extend the life and persistency of the peroxide both in the bath and on the cloth. Although these complexing agents are organic compounds, they are exceptionally stable chemically and are not oxidized by peroxide. They stabilize peroxide solutions by inactivating those metallic ions that catalyze the decomposition of peroxide.

Test work done on steam bleaches of cotton yarn conclusively showed that the silicate concentration could be reduced to 0.65% if the concentration of Versene salts was about 0.05%. A smaller concentration of Versene salts may be used but the concentration should not fall below 0.01% if good results are to be expected.

The presence of scale in peroxide tanks can in many cases be attributed to the deposition of calcium and magnesium silicate. This scale porblem can be overcome by the addition of Versene. If 0.05% complexing agent is present most, if not all, of the calcium and magnesium salts in the water can be inactivated and can no longer react to form silicate scale. If, too, the silicate concentration in the bath can be halved, there is a decidedly less chance to build up silica scale.

When peroxide baths containing no Versene were contaminated with 3 ppm of copper, a very noticeable reduction in bath stability was noticed. This catalytic decomposition was readily counteracted when Versene was added to the bath. Copper and most other metals are inhibited by Versene even though all the Versene has reacted with calcium or magnesium. The copper and most other metals have more of a tendency to form complexes with this agent than do calcium or magnesium. The amount of calcium or magnesium ions which would be released by the traces of catalyst metal ions is negligible. The effects of iron, which is also a decomposition catalyst for peroxide, were also counteracted when Versene Fe-3 Specific was added to the bath. If the amount of iron present is known, then 13 parts of Versene Fe-3 solution is required for every part of iron scale as Fe_2O_3. If the concentration of iron is variable or unknown, good success may be obtained by adding one gallon of Versene Fe-3 Specific per 500 gallons of bleach solution. This quantity may be reduced if indicated by normal plant use. To obtain best results in a peroxide bath, 0.05% Versene should be present. If iron is known to be present, add in addition to the Versene, Versene Fe-3 Specific in the quantities noted before.

The use of organic chelating agents in peroxide baths not only gives better whites more economically by maintaining peroxide concentration longer, but they also minimize scaling of the tanks. Peroxide solutions stabilized by complexing agents are, of course, suitable for use in either batch or continuous procedures.

DYEING——Although there is a considerable amount of information in the literature concerning the effect of metal ions on dyestuffs, there is little information on suitable methods of overcoming the deleterious effects of these metal ions. Versene, however, has been widely and successfully used as an additive to dye baths to overcome the effects of contaminating metal ions.

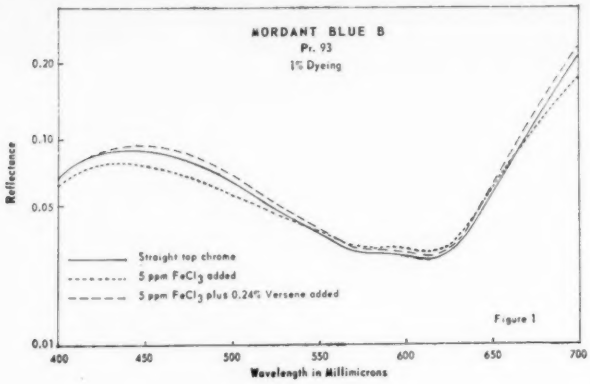

Figure 1

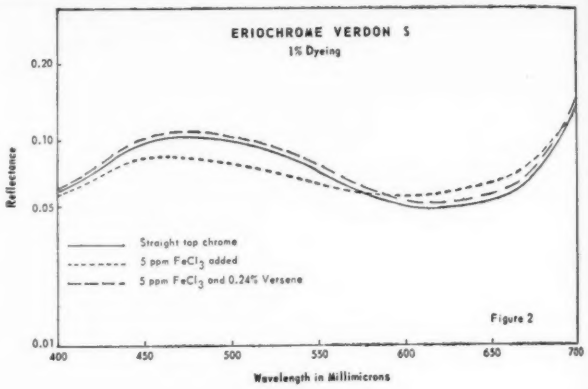

Figure 2

Most dyes have very complicated molecular structures containing nitrogen, carboxyl and hydroxyl groups. These groups in the dye molecule react with metallic ions to produce complex metal compounds having chemical and physical properties which are considerably different from the original dyestuff. Consequently, if metals such as iron and copper are present in a dye bath, off-color shades are very likely to be produced.

For demonstration purposes three dyes were chosen that are quite sensitive to traces of copper or iron. Test dyeings were made with these colors. In each test one dyeing was made with distilled water, another with added copper or iron and the third with added iron or copper as well as Versene. Since it is difficult to explain color changes in words, reflectance curves were made with a GE recording spectrophotometer.

TEST DATA —— A 1% top-chrome dyeing was made with Mordant Blue B (Pr 93) in distilled water as a blank. A second dyeing was made after the addition of 5 ppm Fe to the bath. A third dyeing was made after the addition of 5 ppm Fe and 0.24% Versene. Reflectance curves were made and are shown in Figure 1.

The curve shows an orange effect on the original dyeing when the 5 ppm iron was added to the dye bath. This orange effect is shown by the deformation and lowering of the reflectance curve between wave-length values of 400 to 525 millimicrons.

When Versene was added to the dye bath containing 5 ppm of iron, the orange effect was nullified and the curve was not deformed to any appreciable degree. The reflectance values, however, are slightly higher indicating a small loss (about 5%) of tinctorial power. This loss may be easily overcome by using a slightly larger amount of dyestuff.

A second 1% top-chrome dyeing was made with Eriochrome Verdon S. Test conditions were the same as in the previous dyeings, and the reflectance curve is shown in Figure 2.

These curves show that the addition of 5 ppm of iron caused the addition of orange or red and a loss of blue. The over-all curve is considerably different from the curve of the pure dyestuff.

When Versene was added to the dye bath, the resulting curve has the same shape as the curve of the pure dyestuff. Again, however, the curve of the dyeing containing Versene shows about a 5% loss of reflectance and can be made to coincide exactly with the pure dye bath if a slightly greater amount of dyestuff is used. The important point in these curves, however, is the shape or lack of deformation from the original.

Since dyestuffs are complexing agents for metals such as iron and copper, the addition of another complexing agent leads to competition between the two agents. The stronger agent will gradually extract the metal from the other. The amount of metal that each will complex at the same time depends not only on the formation constant of the complexing agent in question but also upon its concentration and the concentration of the metal ion involved.

A series of test dyeings made with Serichrome Blue R (C I 180) show this action very nicely.

Figure 3 shows one curve for a 0.5% dyeing of Serichrome Blue R containing no metal contamination, one containing 5 ppm copper, and one containing 5 ppm copper plus 0.3% Versene. When 0.3% Versene was added, the color was much more nearly normal, as shown by the curve.

In these dye baths the ratio of copper

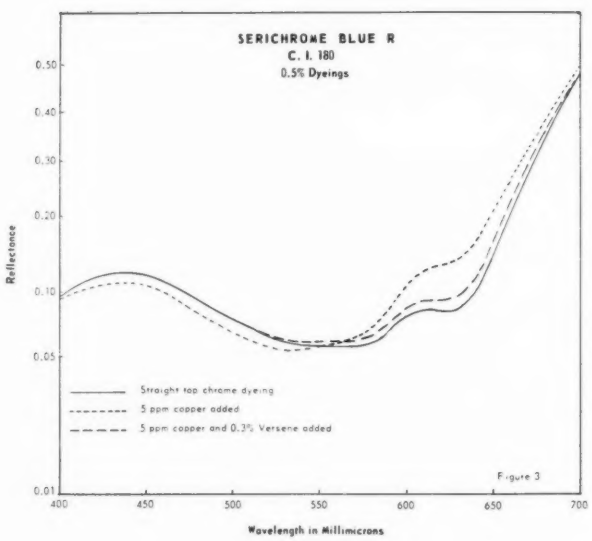

Figure 3

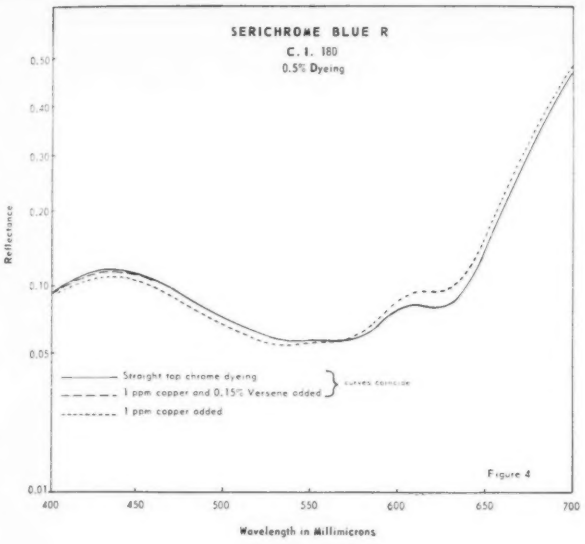

Figure 4

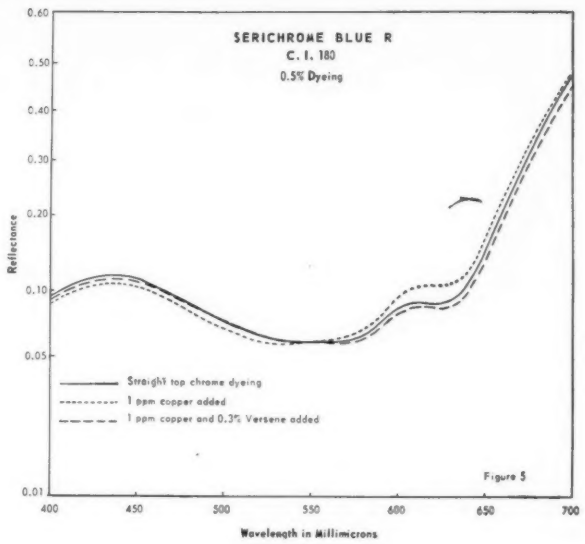

Figure 5

to Versene was as follows:

5 ppm copper to 0.3% Versene

or

1 ppm copper to 0.06% Versene

In a second set of test dye baths the amounts of copper and Versene were changed so that the ratio was 1 ppm copper to 0.15% Versene.

The curve for this second Serichrome Blue R test bath is shown in Figure 4. These test baths contained pure dye, 1 ppm copper and 1 ppm copper plus 0.15% Versene. Examination of the curve shows that 1 ppm copper greatly changed the color. When Versene was added at the ratio of 0.15% per ppm copper, the effects of the copper ions were completely overcome and the reflectance curve is identical to that of the pure dyestuff.

The last tests with this dyestuff were run at a level of 1 ppm copper and 0.3% Versene. The concentration of Versene is twice that of the preceding test. The curves for these test dyeings are shown in Figure 5. As in Figure 4 the presence of 1 ppm copper causes an improvement in the curve. When 0.3% Versene is added, the overall effect is that the curve becomes nearly normal again.

These tests show that, at least for this particular dye, an excess of Versene causes a gain of reflection in the blue region. When the concentration of Versene is correct, the reflectance curve of the pure dyestuff is exactly reproduced.

The data obtained from the dyes Acid Chrome Blue RRA and Serichrome Blue R show rather conclusively that these materials have a very strong affinity for copper. This is to be expected when the structure of these dyestuffs is examined. Both dyes have groups which are capable of forming very strong metallic complex compounds. Moreover, the copper ion, because of its electronic configurations, is able to form much stronger complex compounds than iron, particularly if nitrogen is present in the molecule. This being the case, competition for the copper ion takes place between the dyestuff and the Versene. The Versene eventually wins out and takes the copper away from the dyestuff, but much more than the stoichiometric amount of Versene is required for the amount of copper present. This same competition takes place when iron is the offending metal but not to as great an extent as when copper is involved.

There is another factor which must be taken into consideration when dealing with the theoretical aspect of this problem, but which may be ignored in the practical use of Versene in dye baths. This factor is the action of the organic complexing agent on the chrome content of the dye bath. Versene has no complexing activity for chromium when it is in chromate or dichromate form. However, Versene can complex trivalent chromium, which is formed on the fiber by the reducing action of wool, but both wool and dyestuff also have complexing power for trivalent chromium. Competition between wool, dyestuff and organic complexing agent for chrome will occur, but wool and dyestuff will win out for two reasons: First, both wool and dyestuff are equal to, or better than, Versene in complexing chrome; Second, because of the tremenrous excess of wool, the equilibrium of the chemical reaction ensures that practically all chrome goes into the dyeing process and not into the inactive Versene complex form.

The data presented on the aforementioned dyestuffs cannot, of course, be extrapolated so as to include all dyestuffs, but the general principles involved may be used to overcome the effects of not only copper and iron but also of other common metals on many widely used dyestuffs.

DISCUSSION

Question: What effect has Versene on chromate?

Answer: Chromate and bichromate do not oxidize Versene and Versene has no effect on chromate.

Q: But the chromium that goes onto the fiber is not chromate, is it?

A: That's right; presumably chromium on the fiber is trivalent and is capable of forming a complex with Versene. But such chromium also has a strong tendency to complex with wool. We know that the concentration of Versene recommended for dyeing does not adversely affect the shade, exhaustion or fastness of a chrome dyeing, for which a relatively large amount of chrome in comparison with Versene is employed.

Q: Is Versene precipitated by high acid concentrations?

A: No.

Q: Does acid precipitate the free acid of Versene Fe-3 or Versene Fe-3 Specific?

A: No.

Q: Is this iron complex stable in strong acid?

Note: Spectrophotometric curves were obtained through the courtesy of The Derby Company, Lawrence, Massachusetts.

A: Versene Fe-3 Specific becomes more efficient as an iron-complexing agent as the pH is lowered, that is, as the solution becomes more acid. At pH 10 it takes 13 parts of this agent to complex one part of iron, whereas, at a pH of 6, it requires 3 parts of the agent to complex one part of iron. In a strongly acid solution below pH 2.5 or so, however, the iron complex begins to decompose, but the iron in strong acid remains in solution outside the complex.

Q: Does Versene Fe-3 remove rust from fabrics?

A: When iron is once precipitated on a fabric, it is only slowly removed at the boil. We recommend rather that the precipitation of iron on the fabric be prevented by the presence of Versene in the processing bath. When iron is once on a fabric, it is more easily removed with acid fluoride, commonly used by laundries. Iron stains on cotton may be removed rapidly by treatment with Versene T in hot caustic solutions.

Q: Have you applied Versene in boiler systems?

A: Versene softens water effectively, and it is stable at both high temperature and in alkaline solution. But we do not recommend Versene to compete on a cost basis with a modern water-softening plant where the water is all used up; we recommend it rather as a softening agent in processing solutions to prevent the harmful effect of water hardness.

Versene can be used effectively and economically, however, for softening boiler water on a large scale if all the steam condensate is properly returned for reuse. Then the Versene is necessary only for the make-up water and becomes economical as well as efficient. We have been using Versene in our boiler for years. Examination of the inside of our boiler discloses no scale at all, and therefore heat interchange in that boiler is very efficient indeed.

ANNUAL LADIES NIGHT MEETING, WNE SECTION

Meeting Report—Western New England Section

May 2, 1952

Chase Country Club, Waterbury, Conn

THE Annual Ladies Night Meeting of the Western New England Section was held on May 2, 1952 at the Chase Country Club, Waterbury, Connecticut.

Speakers for the evening were AATCC Regional Vice-President R W Jacoby, Ciba Co, Inc, and B A Ryberg of the Procter & Gamble Company.

An entertaining description of the highlights of his recent European trip was given by Mr Jacoby and a number of interesting fabric samples illustrating the dyeing and printing work being done abroad were displayed.

Mr Ryberg presented the film "Leave Less To Luck", which illustrates the methods used in studying detergency and includes pictures of the microscopical observation of soil removal under various conditions. He then gave a talk pointing out the principles illustrated in the film and their application to textile wet processing.

Approximately 65 members and guests were present.

Respectfully submitted,

A S NYQUIST, *Secretary*

ONE HUNDRED AND EIGHTY-FIRST COUNCIL MEETING

THE Council held its 181st meeting in the Hotel Commodore, New York, N Y, on Friday morning, April 18, 1952. Present were President C Norris Rabold, presiding; Arthur T Brainerd, Arthur W Etchells, Samuel L Hayes and Raymond W Jacoby, Vice Presidents; William R Moorhouse, Treasurer; Leonard S Little, Chairman of the Research Committee; William H Cady, Carl Z Draves, Thomas R Smith and P J Wood, Past Presidents; Edward B Bell, John M Gould and Ernest R Kaswell representing Northern New England; Edward J Allard, Elliot Broadbent, Robert W Joerger and Alden D Nute representing Rhode Island; J Edward Lynn representing Western New England; Carl H Brubaker, Charles W Dorn, Weldon G Helmus, Paul J Luck and Henry L Young representing New York; James Dixon, A E Raimo, Ernest E Rettberg, Jr, Richard B Stehle and S Graeme Turnbull, Jr representing Philadelphia; Joseph Lindsay, Jr, Linton C Reynolds, Henry A Rutherford and Sumner H Williams representing Piedmont; H Gillespie Smith representing Southeast; Glenn R Bellamy representing South Central; Kenneth H Barnard and George O Linberg of the Committee on Conventions, George L Baxter of the Corporate Membership Committee, William A Holst, Jr of the Committee on Constitution and Bylaws, M M McCann of the Student Contest Committee, R Hobart Souther, Chairman of the Piedmont Section, Albert E Sampson, Assistant Treasurer, George H Schuler and Glenn D Jackson, Jr of the Publicity Committee, Harold W Stiegler, Research Director, Percival Theel of the Publications Committee and Harold C Chapin, Secretary.

The Secretary's report of the 180th Council meeting and financial report of March 21, and the Treasurer's report of March 24, were accepted. The Treasurer, with advice of the Committee on Appropriations, was authorized to invest up to $75,000 in short term bonds. Subject to approval of the Appropriations Committee, subsequently granted, a further loan of $2000 from general funds was voted to the Conventions Committee.

For the Publications Committee Professor Theel reported paper for the *Colour Index* about to be ordered, on advice of Mr Sampson's committee, for shipment to England. The Publications Committee considered itself authorized to grant permission for publication elsewhere of any material from *Proceedings* or *Year Book*. Dr Draves was endeavoring to get Intersectional Contest papers condensed and edited for publication prior to their presentation. The monograph on Vat Dyeing would be ready for bids from publishers in about two weeks. The pamphlet on Dyehouse Mathematics was ready for the printer. Harold M Chase, Ethel L Phelps and John N Dalton were to judge papers for this year's American Dyestuff Reporter award.

Mr Schuler reported for the Publicity Committee, Mr Baxter for the Corporate Membership Committee, and Mr Cady on the *Colour Index*.

For the Research Committee Mr Little stated that two thousand dollars previously assigned from Atlantic City convention funds, plus an additional five hundred dollars from general research funds, would be devoted to research under direction of a committee from the Philadelphia Section. Continuation of the American Viscose Scholarship was to be discussed at luncheon that day, with view to resumption of work on the Dynamic Dimensional Change Meter. At this year's ISO meeting in New York, sponsored by the ASA, Mr. Appel was named to head the delegation from our Association at textile conferences on June 13 to 16. Mr Seibert was sending material to Florida for comparative tests under sunlight. Special covers arranged by Mr Herrmann would henceforth add a more attractive appearance to reports designed for Corporate members. The question was raised by Mr Little whether we should issue reprints of part III of the Year Book of 1952, and it was recommended that he consult the Howes Publishing Co as to feasibility.

Dr Stiegler reported arrangements for storage and use of the Olney Memorial Library by the Lowell Textile Institute, but with full title and power of disposition at any time retained by the Association. Laboratory space temporarily withdrawn by the Institute for other purposes had been refinished and restored to the use of the Association. The Acceleroter was nearly ready for marketing by the Atlas Electric Devices Co. Reports on the Salt Project and on the Quartermaster O D 7 Shade on Cotton were nearly ready for publication.

Mr Barnard said that Philip S Durfee would serve as Treasurer of the Committee on Conventions as well as of the Boston convention. As Treasurer of the New York convention, Mr Hennessey presented an audited report and check for $21,306.52 covering any further expenses on that account, registration fees collected to cover expenses of the general treasury and a substantial contribution for research. Mr Linberg reported all Boston exhibit space sold, with exception of that reserved for research exhibits of the Association. Mr McCann reported progress on rules for the Student Contest at the convention, to be presented at the next meeting. Regional elimination contests were planned eventually, with expenses of winners to be paid from convention funds for the final competition at the convention.

A considerable part of the meeting was devoted to discussion of the proposal for a Business Manager located in New York, first presented at the Council meeting of November 16, 1951. This was finally referred back to the President's Advisory Committee, with request for a report at the next Council meeting. Meanwhile all interested were urged to express their views in writing to Samuel L Hayes, Chairman of this Committee.

The next Council meeting was set for the Hotel Statler, New York, on June 13. With approval of the President, and on behalf of the Philadelphia Section as host, the date of the first fall meeting was changed to September 12.

On applications presented by Mr Jacoby, Charlotte Chemical Laboratories Inc, the Gaston County Dyeing Machine Co and the Dow Corning Corporation were elected to Corporate membership, and each of the following was elected to the class of membership specified, as of thirty days from publication of application, provided no objection be received meanwhile by the Secretary.

SENIOR

Allred, E F	Darsey, J A
Anderson, G C	Davidson, H R
Angelo, V	Davis, A J
Bednarski, J R	Davis, G C
Bozeman, W O Jr	Davis, N W
Burrus, N J	Davis, R J
Butterworth, A J	Easley, K W
Calabrese, W R	Ferris, R V
Cameron, N J	Fesperman, J L Jr
Campbell, C J	Finch, C C
Cardos, T T	Fleenor, E B
Chubb, M L	Foster, J B Jr
Clegg, C T	Franks, W M
Cleveland, J B	Frye, R E
Comerro, B L	Gardner, J S

Gauchat, M D
Gay, L
Goldstein, J
Green, E H
Greene, M J
Grossman, L
Haislip, R G Jr
Heintzelman, R J
Henderson, J H Jr
Hendricks, R L
Holliday, J K
Horan, T J
Hribal, S E
Isaacs, H L
Jackson, W E
Jankens, A L
Jones, R J
Jones, W E
Joyce, H T
Keily, V C
Kenyon, G H
Komninos, J A
Lachance, R R
Link, R A Jr
Lo..by, R L
Meriweather, D
Moggio, E A
Moring, C H M
Murray, J S
Newell, W E
Nielsen, F H
Nusslein, J
Odman, T R
Oughton, G W
Owen, T R
Owens, T D
Paessler, K W
Paulsen, D O
Payne, D O
Picciotti, A J
Queen, J H
Querino, A
Remington, W R
Rixon, W E
Roden, R A
Rogenmuser, J W Jr
Scarborough, J J
Schey, F J Jr
Sellars, F H
Serdynsky, E D
Siepert A H
Silbiger, O
Skeuse, T Jr
Skrutkowski, E S
Smith, R E
Speranza, A
Sprague, B S
Staples, G A
Stead, V
Strampe, E F
Stumpf, J E
Surak, H M
Sweeney, W D
Syrmopoulos, D S
Taylor, F G
Wagner, F C
Walshaw, E R
Warner, J S
Watson, C K
Wizemann, L
Wurtzel, J J

JUNIOR

Amodei, S
Anzaroot, A N
Aronson, J O
Artman, N R
Austin, R H Jr
Ballenger, S B Jr
Barnard, W S
Belcher, D W
Ehrhardt, H S
Evans, R W
Foy, J L
Holland, S T Jr
Hollis, J E Jr
Jakob, E C
Jurczak, E F
Kluger, L A
Lindstrom, J R
Mangold, W C
Murphy, J J
Payne, W H Jr
Ross, J M Jr
Seidel, R S
Thompson, D T
Turner, E T Jr
Turner, W F
Weber, R E Jr
Weierman, J I
Wenig, L
Winters, J H
Young, D W Jr

ASSOCIATE

Anelande, E
Bachmann, A
Campbell, R M
Carr, R G
Eckman, L R
Edwards, R A
Eisenhard, R G
Emerson, G A
Flamberg, L M
Flegal, J E
Gibson, C E
Grafton, W D
Handen, S L
Haskel, H
Hays, K W
Lauchenauer, A
Lima, J A C
Meyer, W M
Neves, E M
Paul, W G
Picard, R J
Poggi, C
Roeper, W H
Shaw, A B

SECRETARY'S FINANCIAL REPORT—MARCH 21, 1952

	Applications	*Dues, regular & reinstate*	*Dues, Corporate & Sustaining*	*Miscellaneous*	*Totals*
Received and transmitted to Treasurer					
August 1 to December 31, 1951	$2,627.00	$33,393.50	$17,385.00	$8,048.25	$61,453.75
January 1 to March 21, 1952	1,272.00	8,761.75	26,142.50	3,891.23*	40,067.48
Total in fiscal year to March 21	3,899.00	42,155.25	43,527.50	11,939.48	101,521.23
Leaving deposited by Secretary with Treasurer					9,336.47
For comparison, same date last year	3,362.50	40,176.50	44,685.00	14,093.51	102,317.51

* Miscellaneous items

Dividends and interest	$ 645.65
Equipment resold	190.00
Launder-Ometer royalties	185.00
Reporters and reprints	182.80
Year Books	470.06
Crockmeters	395.85
Crock cloth	613.00
Multifiber cloth, commissions	240.30
Cotton skeins	31.50
Moth cloth	91.00
Water test apparatus	219.15
Dyed standards	112.87
Knitted tubing	69.20
Gas fading units	40.35
Buttons	18.00
Color transfer charts	152.50
Colour Index	30.00
Analytical Methods	195.00
Grease wool	9.00
	$3,891.23

H C CHAPIN,
Secretary

Slayton, P L
Smith, D E
Walker, S A

STUDENT

Baker, W A
Barnhill, B G
Beil, B M
Blum, R H
Boddie, S W
Bratton, L P
Bridgeman, J L
Clapp, W S
Collins, Z L
Darby, L G
Davidman, J L
Degan, R M
DeMassa, D B
Dias, G M, Jr
Garrison, C M, Jr
Griswold, R E
Gunthner, R A
Harris, G N
Heller, D
Hinton, L O, Jr
Holland, R T
Howard, L T
Hurt, H C
Hutto, G A, Jr
Janis, E
Kagi, H M
Laurion, T A
Lehman, E H
Liu, C L
Manderbach, D A
Marsden, W H
Moore, W F, Jr
Peppers, C H
Poplin, C B
Qualls, D A
Robinette, P N
Rosenberg, H
Sartin, J L, Jr
Shanahan, V J
Simpson, C B
Vogel, T
Watson, A L
Wickham, F L

Each of the following was transferred from other classifications to Senior Membership:

Bullock, M C
Goodwin, A W
Greaves, S
Hedberg, D G, Jr
Holweger, C W, Jr
Janson, N W
Kassan, S H
Kearns, M P
Lindsey, C
Lubin, A
Manara, L J
Moskal, F L
Ravanel, E R
Simon, R B
Stevens, R G
Stutzke, A E
Trommer, C R

Respectfully submitted,
H C CHAPIN, *Secretary*

Pacific Southwest Section Announces Two Meeting Dates

ANGUS H ROBERTS, Secretary of the Pacific Southwest Section, has announced the following additional meeting dates:

June 20 — Roger Young Auditorium, Los Angeles, Cal—a symposium on dyeing, printing and finishing is to be conducted under the direction of a panel of local plant supervisors.

October 6 — Ojai Country Club, Ojai, Calif—Annual Outing for members, wives and guests.

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WNE Section to Hold Outing in Wallingford

JOSEPH F MELODY, Chairman of the Western New England Section's Outing Committee, has announced the completion of arrangements for the Section's Fifth Annual Outing on Friday, June 20th at the Wallingford Country Club, Wallingford, Conn.

The affair will begin at 10:00 A M. Dinner is slated for 6:00 P M. Provision has been made for golf, horseshoes, darts, bridge, etc.

In addition to Mr Melody, the Outing Committee consists of Arthur Nyquist, Carl Schilkowsky, Alexander De Marco, Oscar Edelstein, Socrates Vaniotis and Bernard Lustig.

Members and guests of all sections are invited. Reservations should be made with Socrates Vaniotis at Ciba Co, Inc, 627 Greenwich St, New York 15, N Y.

Book Reviews

(Continued from Page 356)

Extensive sections give photomicrographs of common textile fibers and of defects in woven fabrics, a glossary of textile terms, and terms relating to hand of fabrics. Appendices cover basic properties of textile fibers, a psychometric table for relative humidity, a yarn number conversion table, and proposed methods of test for evaluation of properties related to hand of soft-finished woven fabrics, accelerated aging of textiles, estimating the clean wool content in grease wool, and fire retardant properties of treated felt. The other appendices cover proposed recommended practices for calculating the number of tests to be specified in determining average quality of a textile material and for designation of yarn construction.

Finally, the manual includes a table of contents by subject and by ASTM serial designation; it also contains an index of methods of test.—J B M

Neueste Fortschritte und Verfahren in der chemischen Technology der Textilfasern (Part I—Die neuesten Fortschritte in der Anwendung der Farbstoffe)

Volume 3 (Helfsmittel in der Textilindustrie)
Dr Louis Diserens
Verlag Birkhauser Basel (1949)
568 Pages; Fr 68

This, the third volume of part I covering the recent advances in the application of dyestuffs, deals with the assistants of dyeing and printing processes. It is without question the most complete and detailed coverage on the nature and usage of the multitude of chemical products available to the textile industry. The author has produced a very valuable reference book for the chemist.

The text of this volume is divided into chapters dealing with pigment printing, discharge and resist printing, solvents for printing and dyeing, and auxiliaries for printing and dyeing. The last 150 pages is a series of very intricate but well functioning index of authors, literature, patents, chemical products, etc.

It should be pointed out to the American reader that only part of the data presented here has been incorporated in Paul Wengraf and Herman P Baumann's two volume translation of Diserens' work.

Textile chemists will find this book very useful for consultation about auxiliaries even when they can translate German only with a constant use of a dictionary. —R J P

Boiler Feed Water Treatment

Third Edition
F J Matthews
207 pages; Price: $4.50
Chemical Publishing Co (New York)

The revised and enlarged third edition of "Boiler Feed Water Treatment" is a comprehensive book especially designed to guide the small plant engineer in the operating troubles encountered in steam generation —— notably scale formation, corrosion, and priming.

Current research conclusions have resulted in new treatments and improvements in earlier technique to effect economical operation of auxiliary equipment, such as superheaters, turbines, and economizers, as well as the boilers themselves. The book includes up-to-date information on problems concerning caustic embrittlement, carbonate and phosphate conditioning, the mechanism of scale formation and priming and production of wet steam, as well as additional information on silicate scale, hydrogen and demineralizing zeolites, colloidal conditioning, the Budenheim process, electrical scale prevention, turbine deposits, and economizer scaling and corrosion. The section covering the usual methods of testing for efficient operation of softeners is not only valuable for students and chemists, but is particularly useful to the engineer in the interpretation of analytical reports.

Additionally, the author has included 41 diagrams, 27 half-tone illustrations, and numerous selected references to facilitate complete and detailed study of individual problems.—E P J

The Chemical Technology of Dyeing and Printing

Volume II
by Dr Louis Diserens
Translated and revised from the Second German Edition by Paul Wengraf and Herman P Bauman
446 pages; $12.00
Reinhold Publishing Corporation (New York)

Volume II completes the coverage of dyeing and printing (started in Volume I) by presenting the following subjects: "Substantive, Basic, Acid and Pigment Colors, Aniline Black and Dyestuffs for Cellulose Acetate and Synthetic Fibers." This volume is a translation of Volume II and parts of Volume III of "Die neuesten Fortschritte in der Anwendung der Farbstoffe" written by Dr Louis Diserens and originally published in German during 1949.

This book is a very valuable addition to the English literature on dyeing and printing. The translators are to be congratulated on their excellent work and to be thanked for making Dr Diserens' treatise available to English readers.

Dr Diserens' work is renown for its remarkably complete coverage of the practice of dyeing and printing. In this work the reader will find a complete and modern treatment of past and present techniques and formulas. In addition, most of the research in the field as developed in the literature and patents is described by the author. No other English-language book on dyeing and printing practice gives so much essential information in such a readily accessible manner. Dr Diserens has well executed his plan of making this a working reference book for chemists, dyers and printers.

A few of the noteworthy and unique features which make this book valuable as a reference source are the following: an exhaustive treatment of the methods of increasing fastness of direct cotton dyes; tables at the end of each chapter giving names, constitution, references and functions of auxiliaries used in dyeing and printing; extensive coverage of cellulose acetate and the synthetic fibers and complete references to all work described in the text.

No book of this type is without some faults. The authors' dyeing theories do not always conform to the most highly accepted opinions; the well accepted Society of Dyers and Colourists classification of direct cotton dyes is slighted; greater emphasis is placed on printing than dyeing and the chapter on acid dyes is a little brief. Switching from the practice of presenting printing first to that of presenting dyeing first in the various chapters of the book is not desirable either. One style, preferably that of presenting dyeing first, should have been followed.

These points however, detract very little from the great value of Dr Louis Diserens' book. This volume is a welcome addition to any textile library.—RJP

Volume I—The Chemistry of Synthetic Dyes

K Venkataraman
Academic Press, Inc, New York (1952); $14.50

This volume is the first of a two-volume treatise in the area of dye chemistry by Professor Venkataraman. With the exception of certain monographs on special topics and several texts on application, there have been no new texts in this area for about 20 years. It would seem somewhat unfortunate that this new book should appear before the 2nd Edition of the *Colour Index*, as it would have been a decided advantage to cross-

reference the two books. This can be remedied easily enough in future editions.

The first four chapters are concerned with the history, organization and synthetic organic chemistry of the dyestuff industry. The historical aspects are quite interesting and somewhat reminiscent of some of Dr Whittaker's remarks along these lines. One apparent error noted in the Industrial Organization section was the statement on pg 13 as to the relative production of the various companies. The figures given are misleading and may even be incorrect. If they are on a poundage basis, then they could definitely be misleading. If they are on a dollar basis, they are incorrect. No statement as to basis is made. According to the reviewer's information, DuPont and General are the largest producers on a dollar basis. National is third and Calco fourth. General, DuPont, National and Calco make about 80% of the total. The synthetic organic chemistry treatment is very well done with copious references to modern synthetic methods. The use of heavy and light type is particularly noteworthy as an aid to finding specific compounds and reactions. Considering the amount of space involved, there is a tremendous amount of material covered. The arrangement is orderly and concise.

Chapter V is concerned with the methods of classification of dyestuffs. Examples are given of each class based on both dyeing method and chemical structure.

Chapter VI is on dyestuff application. The reviewer feels that this is probably one of the poorest chapters in the book. It would seem that every text on dyeing persists in an antiquated discussion of textile fibers. The usual photomicrographs are shown—and called "microphotographs" (see Webster's Dictionary). The usual "structural" formula is shown for cellulose, with no reference to the fact that it can exist in "boat" and "chair" forms. Probably the best monograph available on cellulose, namely, "The Physics and Chemistry of Cellulose" by P Hermans, is not referred to. The reviewer feels somewhat disturbed by the appearance in practically every recent book on Textile Chemistry and Dyeing of this same antiquated formula. If it must be included, at least mention should be made of what it actually represents. The remainder of the chapter on dye application is good, generally well documented, and up to date.

Chapters VII and VIII are concerned with Color Measurement and Color and Constitution. The chapter on color measurement is accurate and well written but it seems as though emphasis is placed on certain aspects of colorimetry and spectrophotometry, which are not of prime importance in considering dyestuffs. Sufficient references are given, however, to serve as a guide to the field. The chapter on color and constitution is extremely complete with many references. Every theory is present. The only criticism would be the lack of critical evaluation of rival theories. But perhaps, in view of the turmoil in color theory, it is better not to be too critical. No reference could be found to the excellent book by Bowen, i e, "The Chemical Aspects of Light".

The remaining chapters (IX-XXII) are concerned with the various classes of dyes from both the chemical and application standpoint. The treatment is complete, and generally in line with the latest knowledge. Since this is an area in which recent information has been in the past only available in journals or patents, these chapters are doubly valuable.

In general, Professor Venkataraman has made a considerable contribution to the field. The amount of work involved in preparing such a well-documented reference work is enormous. In practically every case where the reviewer knew of some important reference in a certain field, he found the reference given and also correct. A few minor omissions were discovered, such as the failure to mention "Pontacyl" as the most common name for DuPont's acid dyes, but these are hardly worth mentioning.

No one who is concerned with the chemical aspects of dyestuffs should be without this valuable book, even at the seemingly high price of $14.50 per volume.—R E D, Jr

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Vinyl and Related Polymers

Calvin E Schildknecht
xi — 723 pages; $12.50
John Wiley and Sons, Inc
New York (1952)

Based on work originally begun with Allied Intelligence Reports in 1946, this book is an encyclopaedic work on the vinyl polymers —— high polymers and copolymers derived from styrene, vinyl chloride, vinyl acetate, isobutylene, acrylates, ethylene, vinyl-ether, sulfur-vinyl compounds, nitrogen vinyl polymers and others. The methods of synthesis, properties, advantages and disadvantages of the polymers are discussed and trade names and suppliers, both American and European, are given. Because of the recent surge of the vinyl type polymers into the textile field (Orlon, dynel, etc), the work is indispensable to any textile chemist working with synthetic fibers, though it is not to be recommended as a critical review of the preparation and properties of the polymers used in the textile field. Emphasis is on completeness rather than in critical evaluation of the many references given, over four thousand in the book as a whole.

In a book of this type, much depends upon the index. Although reasonably complete, this reviewer was able to find a reference to a photographic application of 2-vinyl pyridine polymers on p 167 not listed in the index on p 718. The references are clearly set out but there is no author index.

Dr Schildknecht has performed a service to all workers in the field.—G B

Plastics Molding

John Delmonte
vii — 493; $9.00
John Wiley and Sons, Inc
New York (1952)

This book, written by an engineer with eighteen years' experience in the plastics field, ten of which were as technical director of Plastics Institute, deals with the compression, transfer, injection molding, extrusion and finishing of plastic products. An important feature of the book is the attention paid to the equipment used in carrying out these operations. Hydraulic pumps, valves, molding machines and the design of molds, performing presses, instruments, among other pieces of equipment are described in detail. The background of hydraulic flow and heat transfer is also covered, from an engineering standpoint. This is a book which should be useful to the plastics production supervisor and engineer, but should not be consulted for the chemistry or properties of plastics.—G B

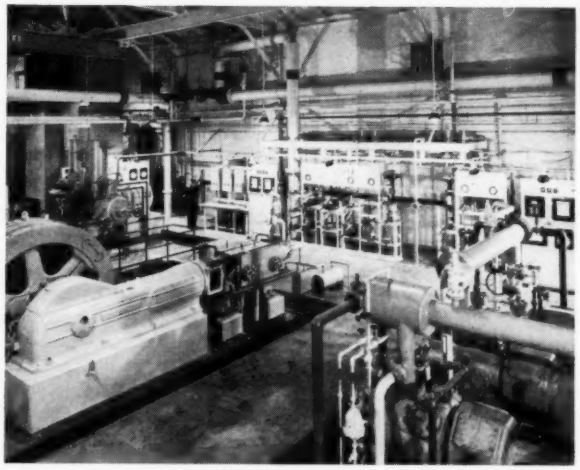
Pulp and Paper, Volume I

James P Casey
xxiii — 795 pages; $15.00
Interscience Publishers, Inc
New York

Volume I of this two-volume work covers pulping and papermaking; it is planned that Volume II will take up paper converting. As might be expected, a book of this kind contains much of interest to the textile chemist. A review of the chemical and physical properties of cellulose, bleaching of pulp, a process which while differing in many respects from that of cotton has a number of points of common interest, coloring or dyeing of which the same may be said, microbiology and water, properties and treatment, are chapters which stand out in this regard. To the pulp and papermaker the volume offers a compilation in one place of most of the chemical work which has been done in this field; it is invaluable as a work of reference.

It is unfortunate that a book on papermaking should be so poorly printed on a comparatively poor paper.—G B

NEWS



An interior view of Hooker Electrochemical Company's new $2,000,000 anhydrous ammonia plant at Tacoma, Wash.

• New Hooker Plant Begins Operations in Tacoma

Operations have begun at the $2,000,000 anhydrous ammonia plant of Hooker Electrochemical Company at Tacoma, Washington, a unit constructed to serve the growing requirements of the chemical industry and the pulp and paper mills of the Pacific Northwest. With the entire production of the new plant contracted for, plans are already under consideration to increase its capacity by 50%. The output for the time being is being shipped entirely by tank car.

Hydrogen required for the process is reportedly obtained from Hooker Type S and S-3 electrolytic cells, which convert salt brine into caustic soda, chlorine and hydrogen. Nitrogen is obtained from the air by means of liquefying equipment supplied by L'Aire Liquide of Montreal. Design and erection of the anhydrous ammonia plant were supervised by the Chemical Construction Corporation.

• ASTM Set for 50th Anniversary Meeting

The American Society for Testing Materials will conduct its 50th Anniversary Meeting at the Hotels Statler and New Yorker, New York, N Y, from June 23-27. In conjunction with the meetings the 10th Exhibit of Testing Apparatus and Laboratory Supplies and the 8th Photographic Exhibit will be held.

Admission to all symposiums, technical sessions and exhibits is open to the public.

• Chemists' Club Officers and Trustees

Officers for 1952-1953 elected at the Annual Meeting of the Chemists' Club, New York, include: *President,* William F George; *Resident Vice-President,* Ira Vandewater; *Nonresident Vice-President,* R J Quinn; *Suburban Vice-President,* F W Sullivan; *Treasurer,* L E Erlandson; *Secretary,* Lloyd Van Doren.

Also elected as Trustees for the three-year term 1952-1955 are Thomas B Drew, S H Farkas, Foster D Snell and Lincoln T Work.

• Southern Latex Project at Georgia Tech

The Southern Latex Corporation, Austell, Georgia, has initiated a project at the Georgia Tech Engineering Experiment Station to provide research on latex products, particularly those used by the textile, cotton rug and carpet, and paper industries. Emphasis will be placed on the development and application of Southern Latex products as specifically applied to textile and paper products made in the Southeast.

• ACC to Build in Louisiana

American Cyanamid Company will build a plant near New Orleans, Louisiana for the production of chemicals from natural gas, according to K C Towe, the Company's President. This will place Cyanamid in the field of basic production from hydrocarbons, a development which is expected to add a substantial number of new items to the more than 5,000 products already manufactured by the Company.

The new plant, for which a Certificate of Necessity was recently issued by the Government, reportedly will represent an investment of about 50 million dollars and will be located on a 600-acre site in Jefferson Parish, Louisiana, about 10 miles above New Orleans on the West bank of the Mississippi River. As initially projected, the plant will produce ammonia, acetylene, hydrocyanic acid and derivatives of these products, among them acrylonitrile and ammonium sulfate.

In the initial stage of its operation, the plant is expected to employ about 400 persons, with a fairly rapid increase to about 600. Employees for the new plant will be hired locally. An extensive training program is now being formulated.

The Louisiana site offers the Company many advantages, including the availability of natural gas, a year-round supply of process water from the Mississippi, transportation by river, highway and two railroads (Texas & Pacific and Southern Pacific) all adjoining the property, a favorable climate, nearby markets in the textile and rubber fields, and a good source of operating personnel.

The plant will consist mainly of outdoor type manufacturing process units with administration, maintenance, warehousing, employee services and control laboratories being housed in one or two story buildings.

Chemical Construction Corporation, a subsidiary of American Cyanamid Company, is the architect-engineer and construction manager of the plant. A construction sub-contract has been awarded to the J A Jones Construction Company of Charlotte, North Carolina. Various New Orleans contractors will participate in the building of the plant. The Texas Company will supply natural gas while power will be supplied by the Louisiana Power and Light Company.

• Solvay Dedicates New Soda Ash Plant

The Solvay Process Division, Allied Chemical & Dye Corporation, marked completion of its new multi-million dollar soda ash plant at Syracuse, N Y, on May 10th with dedication ceremonies and an open house for employees, their friends and the general public.

The new building, embodying the latest equipment in alkali manufacturing, is the key project in the company's modernization program at Syracuse which was started at the close of World War II and has involved capital investment in excess of $20,000,000.

During dedication ceremonies A B Chadwick, Solvay president, turned over to R G Zimmer, plant manager, a glass key symbolic of one of the major uses of soda ash as a basic alkali by other industries. Hugo Riemer, executive vice president, Carlton Bates, vice president, H R Margetts, director of operations, and D O Yeoman, director of development, Solvay alkali section, also participated in the dedication.

The new unit replaces one constructed in 1912. The old operation has continued in production as the new one was erected nearby. Designed with extensions in mind, one side of the new soda ash building is sheathed with removable partitions to help accomplish this expansion in the future.

The new plant rises 220 feet, equal in height to a fifteen-story office building. Constructed of concrete and steel and faced with buff-colored tile and incorporating extensive use of glass blocks, it is of simple, functional design, with some 170,000 square feet of floor area. Its modern, rigid-frame construction is reportedly designed to withstand wind forces of over 100 miles per hour.

The towering center structure of the operation houses the distillation columns which are the heart of the ammonia-soda process for making soda ash. The tower section has two modern, push button, self-leveling elevators, with a speed of 200 feet per minute enabling workmen to quickly reach any part of the distillation equipment.

Lower levels of the structure represent sections devoted to other steps of soda ash production, among these the compressor and dryer sections. The compressor section includes a 30-ton capacity traveling crane.

The chemical processing equipment designs and manufacturing specifications of the new plant were prepared by the Solvay Engineering Department, under the direction of Mr Yeoman and C P Hackett, who was chief engineer during most of the construction period and is now assistant director of development.

Sales heads of all General Aniline & Film Corporation Divisions and General Dyestuff Corporation view exhibit at Park Lane Hotel. (L to r): L P Naylor, General Sales Manager, Ozalid Division; William Balch, General Sales Manager, Ansco Division; Jack Frye, President, General Aniline and General Dyestuff; S H Williams, Vice President and General Sales Manager, General Dyestuff; and John Hilldring, General Manager Foreign Operations, General Aniline and General Dyestuff.

• GAF, GDC Inter-Divisional Sales Meetings

Something new in industrial sales meetings took place on May 20 when sales executives of General Aniline & Film Corporation and General Dyestuff Corporation gathered at the Park Lane Hotel to exchange ideas and pool information on an inter-divisional basis.

Jack Frye, President of both companies, opened the meeting by explaining that its purpose was to stimulate a "cross-fertilization" of ideas among the sales executives in charge of the companies' highly diversified product lines.

The meeting, first of its type in the history of the companies, featured first hand analyses of marketing conditions throughout the nation, presented by the District Sales Managers of the Companies. Long term trends in all of the companies' principal product lines were also discussed.

Sumner H Williams, newly elected Vice-President and General Sales Manager of General Dyestuff, chemical and dyestuffs sales agent of General Aniline, stressed the importance to the dyestuff industry of the growing synthetic textile market. He claimed that research has only "scratched the surface" of the dyeing technology that must be developed to take care of the problems that will develop with the increased use of synthetic textiles. He declared that the competitive race in this new field will go to the dyestuff manufacturer who can "sell and keep his customers sold" by rendering efficient technical service on problems connected with the dyeing of synthetics.

A look at the photographic supply field was presented by William Balch, General Sales Manager of the Ansco Division of General Aniline. Lewis P Naylor, General Sales Manager of the Ozalid Division of General Aniline, disclosed that the reproduction of business documents represents the new large frontier for sales effort in the reproduction equipment field.

The growing pride of foreign nations in their own industries was cited by John H Hilldring, General Manager of Foreign Operations of General Aniline and General Dyestuff, as a matter of major importance in international trade. He told the assembled sales executives that the time is past when American manufacturers can depend exclusively upon their volume of output for strength in the international market.

Today, Mr Hilldring continued, technological know-how has become American industry's strongest point in dealings with foreign interests. This fact, he concluded, is reflected in the increased tendency of American firms to enter into joint enterprises in foreign countries with the nationals of those countries. In many such cases, he said, the American contribution to the enterprise consists exclusively of technological skill and information.

• L & N Purchases Large Pennsylvania Tract

The purchase of a 125-acre tract of land at North Wales, Pa, in the Philadelphia suburban area, has been announced by Leeds & Northrup Company.

Although ultimate use of the tract remains to be determined by engineering surveys, according to C S Redding, president, the company contemplates moving to the new location certain operational or laboratory units from its main plant in Philadelphia.

• GDGA Accepts Canadian Member

Walter Loebl, President of the Garment Dyers Guild of America has announced the acceptance of Spotless Stores, Vancouver, Canada, as member of the Guild.

The Guild, which is the trade association of garment re-dyers, has been operating in the States for several years but this is their first member outside the borders of the U S.

• Hercules Enters New Chemical Field

With a new $8,000,000 plant for the production of phenol, para-cresol, and acetone scheduled for completion in 1953, the Hercules Powder Company is now "officially" in the field of chemicals produced by hydrocarbon oxidation.

It is understood that production of para-cresol and cymene alcohols will be sufficient to care for expected increasing demands of industry while production of phenol and acetone will also be appreciable. The phenols reportedly will be produced from aromatic hydrocarbons, and cresols from terpene hydrocarbons by a unique oxidation process. The heart of the new process is the production of organic hydroperoxides as the basic intermediate step. These are readily converted to phenols.

Unlike existing processes for manufacture of phenol, the new method does not consume sulfur or chlorine. The simplicity and versatility of the process are said to be such that other substituted phenols and phenolic materials may be produced at will, with minor equipment modifications, depending on the hydrocarbons oxidized.

The plant will be located in the Delaware River industrial section, where both propylene and benzene will be readily available from petroleum refineries or coke ovens in the area. Terpenes, the raw materials for the new para-cymene process, will come from Hercules naval stores operations in Georgia and Mississippi.

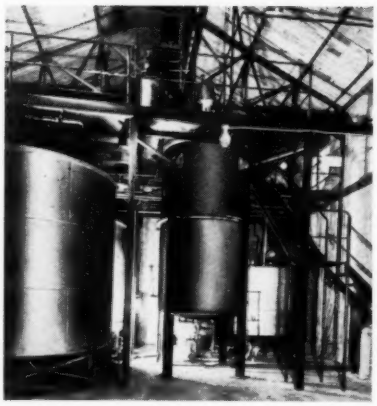
• Labline, Inc Moves Into Larger Quarters

Labline, Inc, Chicago, Ill, manufacturers of laboratory apparatus, instruments, and equipment, is now located in new larger quarters at 217 N Desplaines St. Their new location reportedly offers considerably enlarged manufacturing, research, and development facilities. The company, formerly known as Laboratory Industries, Inc, was located at 4710 West North Ave.

• 8th ITT Membership Meeting

Ninety-six mill members and guests attended the Eighth Annual Membership Meeting of the Institute of Textile Technology, held recently in Charlottesville, Va.

Featured at the parley was an analysis of inter-industry research called the "Seventeen Mill Tests", with emphasis upon the relation of processing conditions to yarn and fabric properties. The tests were sponsored by the National Cotton Council and the American Cotton Manufacturers Institute, while the analysis of the data was made by the Institute Research staff.



An overall view of the hydrogenation unit at W C Hardesty Company's New Toronto Plant

• $100,000 Canadian Enterprise by Hardesty

The first plant in Canada for the production of hydrogenated fatty acids and glycerides in the inedible field has been completed at New Toronto, Ont—a $100,000 enterprise by W C Hardesty Co.

The new hydrogenation equipment reportedly includes all the latest improvements developed through years of experience at Hardesty's Dover, Ohio, plant. It is designed to be operated completely by one man. The progress of the entire reaction is automatically recorded on a centrally located control panel from which all process variables may be controlled.

With a long range program of development already initiated, it is anticipated that 12-hydroxy stearic acid, now used only in experimental batches because of its high price, may be produced economically in this type of unit. Also, materials such as partially hydrogenated fats and fatty acids for specialized industrial uses are being considered.

• National Textile Fraternity Elects Officers

The Delta Kappa Phi Fraternity of America, Inc, elected the following new national officers at the Convention held recently at the Philadelphia Textile Institute:

Supreme Consul—A Ward France, Head of Wool and Worsted Department and Director of the Evening School of the Phildaelphia Textile Institute.

Supreme Pro-Consul—Henry A Rutherford, Head of Textile Chemistry and Dyeing Department at the North Carolina State College.

Supreme Anatator—Clifford M Gilpin, Jr, Superintendent of the Downs Carpet Company, Philadelphia, Pa.

Supreme Custodian—Stanley A Pikalow, Jr, Manager of the Beltex Mills, Philadelphia, Pa.

• Million Dollar Plant in Alabama

The opening of the Borden Company's new chemical plant at Demopolis, Ala, reportedly the first in the Southeast to manufacture formaldehyde, synthetic resins and hexamethylenetetramine, was announced on May 22 by William F Leicester, president of the company's Chemical Division. The plant is said to have been built at a cost of more than $1,000,000.

Initial annual production of the plant will reportedly approximate 20,000,000 pounds of formaldehyde, 24,000,000 pounds of synthetic resins, and 1,200,000 pounds of hexamethylenetetramine, an intermediate product. If the national defense program requires it, the production of "hexa" can be stepped up to 4,000,000 pounds annually, according to Mr Leicester, and with minor adjustments, the plant can also turn out other chemicals needed for national security. Raw products for these can be obtained from the coke ovens of the Alabama steel-producing region and petroleum fields of Texas and Louisiana.

The formaldehyde will be used principally by the Demopolis plant itself and its sister Borden plant at Kernersville, N C, in the manufacture of synthetic resins, it is learned. The area to be supplied includes Alabama, Georgia, Mississippi, North Carolina, South Carolina, Florida, Louisiana, Texas, Tennessee and Arkansas.

The new plant occupies about one-third of a 20-acre tract acquired by Borden's last year, permitting expansion in the future. It includes a main building of steel and concrete for use as a warehouse, office and laboratory, and other out-buildings to house the machine shop and employee service facilities. The production units—the formaldehyde unit, a reactor, storage tanks and towers—and other processing equipment are out in the open.

In addition to the Demopolis and Kernersville, N C, plant, Borden's have five other chemical operations in Bainbridge, N Y, Union, Ill, Seattle, Wash, Springfield, Ore, and Philadelphia. Nearing completion is another plant, at Dominguez, Calif, where the Chemical Division will manufacture resorcin.

• U S Rubber Announces New Financial Aid Program

A new five-year program of financial aid to science students in 11 leading universities was recently announced by the United States Rubber Company. The new program will reportedly provide graduate fellowships in science to 11 students at an approximate cost of $174,000.

Barry Goldstein of Passaic, N. J., a student at the Philadelphia Textile Institute demonstrates the G E self-recording spectrophotometer to a group of students during PTI's recent Open House.

• Over 500 Attend PTI Open House

A demonstration of the GE self-recording spectrophotometer was one of the highlights of Open House at the Philadelphia Textile Institute on May 1st.

During the day over 350 high school students visited the Institute to tour the textile laboratories and see the exhibits and demonstrations prepared by the testing, dyeing, colorimetry, physics and chemistry laboratories. Schools from New York, Atlantic City, Jersey City and Lebanon, Pa, were represented in addition to those from the Philadelphia area. In the evening the Institute was host to some 200 adults from Philadelphia and vicinity.

Visitors, guided by students, were able to witness all steps in the production of fabric from raw material to finished goods on the modern equipment of the school.

• 15th Summer Refresher Course in Textiles

The United States Testing Company has announced that the 15th Summer Refresher Course in Textiles and Testing Techniques (s-275) will be conducted during the first half of the Teachers College Summer Session, Columbia University, July 7-25. The course will be held at U S Testing's main laboratories in Hoboken, N J, and will carry 3 point credit toward a degree. The course is open to representatives in the field of home economics, education, retailing and others who have had some elementary textile training. Through lectures, demonstrations, and practice sessions, students will cover all phases of analyses on textiles and related merchandise, identification of fibers, dye chemistry, detergency and research. Special emphasis will be given to the various textile processing and finishing techniques, with field trips planned for those students who are interested.

For further information and application forms, write to: Miss Dorothy McDonald, Director, Consumer Service Division, United States Testing Company, Inc, 1415 Park Ave, Hoboken, N J.

• TRI Annual Meeting Dates

The Textile Research Institute has scheduled its 23rd Annual Meeting for Monday and Tuesday, November 17-18, 1952. Site of the meeting will be the Grand Ballroom of the Hotel Commodore, New York, N Y.

• Program for Short Course in Soap and "Syndets" Announced

The complete program for the Short Course in Soap and "Syndets" to be presented at Rutgers University July 6-11th has been released by Foster Dee Snell, General Chairman.

Assembly is at a Mixer Sunday evening, July 6th. Monday's program on Soap Raw Materials, chairmanned by Arthur L Fox, has as speakers A J Stirton, E M James, V J Muckerheide, N A Ruston, and F J Schlink. Tuesday's speakers on Soap Processing include John W McCutcheon, Martin D Reinish, W A Peterson, John W Bodman, and W A McConologue, with J L Hale as chairman. Soap properties will be discussed Wednesday by M G Krame, A E King, E H Balkema, E L Boley and F D Snell, with A S Richardson as chairman. Chairman for Thursday's program on Surfactants and "Syndets" is J W Bodman and the speakers are H E Bramston-Cook, Lawrence H Flett (with David R Byerly presenting a film), Roy Peet, and a speaker from California Research Directors. Friday's program on Evaluation Methods, chairmanned by Francis Scofield, has as speakers C P Long, John A Nevinson, J C Harris and Edmund Ritchie.

Plant trips are scheduled throughout the week.

TECHNICAL LITERATURE

The Coloring of Post-War Synthetic Fibers

Technical Service Division
National Aniline Division
Allied Chemical & Dye Corp
40 Rector Street
New York 6, New York
Available on request

With annual U S production of synthetic fibers approximately 2½ billion pounds, this 24-page booklet is most timely.

Described are the chemical and physical natures of the new acrylic and terephthalic acid fibers in relation to nylon. Dyeing techniques suitable for the various fibers are given in detail together with precautionary measures to be observed in processing these new products.

Soda Ash—Its Properties, Loading and Unloading, Handling and Storage

Bulletin 5
Solvay Sales Division
Allied Chemical & Dye Corp
Adv & Sales Promotion Dept
40 Rector St, New York 6, N Y
Available on request

This is a new, expanded and revised edition containing new material and revisions in addition to the charts and data that were included in the widely-circulated previous editions.

Contents include material relative to properties, bulk shipments and storage of soda ash; conveying and elevating; unloading bulk soda ash; unloading and handling bags and barrels; weighing, proportioning and feeding devices; sampling and analysis of soda ash.

Burling Temperature Controls

Catalog G-17
Burling Instrument Co
South Orange, N J
Available on request

Catalog G-17 describes Burling's full line of temperature controls, including the new Model V-1C—an electric type with a vapor tight cover; the model HA—for use in pneumatic systems; and the various models Y—temperature controlled valves. Tables of application and performance for all instruments are included.

Dresinate for Soluble Oils and Alkaline Cleaners

Hercules Powder Company, Inc
Wilmington, Delaware

Properties and a variety of applications for "Dresinate", a series of sodium and potassium salts of rosins and resins, are discussed in this booklet, which covers various grades of the product in dry, liquid and paste form.

Also included are two sections on the use of "Dresinate" for emulsifying soluble oils and for extra-action alkaline cleaning compounds. Among the other suggested applications for "Dresinate", cited in the booklet, are as an emulsifier in textile oil emulsions, pine oil emulsions, and tar-acid emulsions; in soaps and detergents; in household cleaners; and in industrial cleaners.

The foreword of the booklet explains that the various grades of "Dresinate" are used as emulsifying agents, detergent additives, dispersants, foaming and flotation agents, viscosity-control agents, industrial sizing compounds, and in other applications where the use of uniform soaps of rosin acids is indicated.

Oxidation of Vat Dyes on Cotton and Synthetics with Hydrogen Peroxide

Bulletin 38
Research & Development Dept
Buffalo Electro-Chemical Company, Inc
Becco Sales Corporation
Station B, Buffalo 7, N Y
Available on request

Fully covered are typical procedures for oxidizing vat dyes with hydrogen peroxide. Included are dye oxidation on continuous ranges, on the jig, and in package machines. Yarn and raw stock dyeing are treated separately.

Step-by-step procedures for each type of oxidation are carefully described. Advantages to the user of hydrogen peroxide in oxidizing vat dyes on cotton and synthetics are offered, among them the clear shades obtained, the easy removal of residual chemicals, and the convenience with which the equipment can be operated.

Textile Chemicals

Research Bulletin No 62
Research Information Service
53 Nassau Street, New York 38, N Y
Available on request

A large number of recent patent applications by German manufacturers dealing with manufacture and processing of textile auxiliaries are now available in English translation as listed within this bulletin.

Under four main headings, the Bulletin lists 50 reports on surface-active agents, proofing agents, finishing agents and diverse manufacturing processes. Among the reports are the following:

A process for producing water-soluble sulfonic acids makes use of novel catalysts which lead to high yields of alkylarylsulfonates of excellent quality (Report No. 5329; $12.00);

A process for producing polyglycol ethers yields products of superior emulsifying power well-suited for the preparation of textile lubricants (Report No. 5332; $11.00);

The use of polyvinylpyrrolidone in dispersing agents containing sulfonic acids facilitates dispersion and makes addition of a preservative unnecessary (Report No. 5335; $3.75);

A process for producing surface-active agents from residues of the butadiene synthesis gives highly effective wetting agents, emulsifiers and detergents (Report No 5340; $3.75);

Certain sulfur-containing ethers constitute very economical softeners, which also improve the washfastness of substantive dyeings (Report No 5344; $3.00);

Condensates of imino ether salts and polyvalent amines are suitable as sizing agents distinguished by high resistance to strong mineral acids (Report No 5348; $7.00);

A process for stabilizing textile finishing agents proposes substances which prevent the aging of methylol compounds (Report No 5351; $3.75);

Mothproofing agents composed of improved arylsulfonic aralkylamides are highly efficacious and characterized by good fastness to ironing and excellent heat resistance (Report No 5356, $5.00);

Valuable intermediates for textile aids are obtained by preparing derivatives of low-polymeric unsaturated carboxylic acid polymers (Report No 5360; $7.00).

Remote Pressure Recorder

Minneapolis-Honeywell Regulator Co
Brown Instruments Division
Station 40
Wayne and Windrim Avenues
Philadelphia 44, Pa
Available on request

Honeywell Instrumentation Data Sheet 10.2-5 describes a Remote Pressure Recorder comprising the Frederick Flader Teledyne Unit plus the Brown *ElectroniK* Recorder. Applicability, equipment requirements, and operating principles are all discussed in this sheet. Photographs of the equipment plus specifications for the Pressure Transmitters, plus dimensional drawings of the basic types of *Teledyne* pressure transmitters are included in the data sheet.

Dyeing Synthetic Fibers

General Dyestuff Corporation
435 Hudson Street
New York 14, N Y
Available on request

This revised treatise on the most up-to-date methods of dyeing most of the new synthetic fibers and blends has been issued by GDC's Technical Department, headed by J Robert Bonnar. Current solutions to the problems of dyeing the new synthetics, which vary in complexity with the end use of the fiber, are discussed.

The methods described are not final in nature, but are believed to be the most current since they include new data and approaches developed since an earlier publication.

Alumaloy Pressure-Formed Laboratory Clamps

Labline, Inc.
217 N Desplaines Street
Chicago 39, Illinois

Four additional pages of new Alumaloy clamping devices and other important new laboratory items, such as magnetic stirrers with Teflon-covered magnets, electric stop-watches and carboypumps, are included in this latest catalog of Laboratory Industries, Inc.

Galvanometers and Dynamometers

Catalog Section ED
Leeds & Northrup Co
4934 Stenton Avenue
Philadelphia 44, Pa
Available on request

The complete line of standard galvanometers, dynamometers, d-c indicating amplifiers, and accessories for use in null-balance or calibrated deflection measurements is presented in this newly-revised, 20-page catalog section.

In addition to d-c and a-c galvanometers of the pointer or reflecting type, this publication now describes and illustrates low-level d-c indicating amplifiers which can be used as null detectors, direct-reading instruments, and recorder pre-amplifiers. Other new information tells about the outstanding design features of these and other detectors. Galvanometer reading devices of new design are also pictured and listed for the first time.

The catalog section also includes a galvanometer selector guide, replete with diagrams that graphically define various galvanometer characteristics.

Commercial Standard for Flammability of Clothing Textiles (#TS-5131)

H A Ehrman
Commodity Standards Division
Office of Industry and Commerce
U S Dept of Commerce
Washington 25, D C

Several years ago a number of fatalities resulted because of the extremely flammable character of certain articles of clothing, particularly long-napped rayon chaps of children's cowboy suits. It was realized that before legislation could be passed to control the sale of unsafe clothing a nationally recognized method would be required for distinguishing between safe and unsafe clothing textiles.

The American Association of Textile Chemists and Colorists together with the National Retail Dry Goods Association undertook a series of investigations to develop a reliable method of test and apparatus for conducting the test, while the Commodity Standards Division was requested to act as a coordinating agency to secure national recognition of the method. A number of laboratories made extended series of tests to correlate the method with the practical experience of the industry.

Recent publicity arising from the discovery of highly-flammable brushed-rayon sweaters on the market speeded up the work on the development of a standard for the flammability of clothing textiles, which is now being circulated for acceptance by industry. It represents the combined opinion of an Industry Committee representing cotton and rayon producers, and fabric manufacturers, finishers, converters, wholesalers, retailers, and consumers.

The standard is intended to serve as a guide in the manufacture and sale of only those clothing textiles not dangerously flammable. It provides for standard methods of testing clothing and textiles intended for use in clothing and establishes three classes of flammability, 1) covering those textiles generally accepted by the trade as having no unusual burning characteristics, 2) covering those textiles recognized by the trade as having flammability characteristics between normal and rapid and intense burning, and 3) covering those textiles recognized by the trade as being unsuitable for clothing because of their rapid and intense burning. It further establishes limiting requirements for identifying each of these three classes. The methods of tests and classifications for flammability are reportedly the same as those recently approved as a standard of the AATCC.

Progress in Peroxides

Bulletin 36
Buffalo Electro-Chemical Co, Inc
Station B, Buffalo 7, N Y

Compiled and written by H O Kauffmann and F P Greenspan of the Buffalo Electro-Chemical Company, Inc, Research and Development Dept, this 26-page bound bulletin presents a composite picture of properties and applications of two important peroxygen chemicals: hydrogen peroxide and peracetic acid.

Oxidizing and reducing properties, bactericidal and fungicidal properties, free radical formation, high heat of decomposition and reaction, and gas formation on decomposition are characteristics of the peroxygen chemicals which account for their usefulness in a variety of applications. With the help of practical examples, tables and diagrams, Bulletin 36 provides a broad coverage of these applications.

Emersol 240 Vegetable Elaine

Bulletin 37
Emery Industries, Inc
Dept 5, Carew Tower
Cincinnati 2, Ohio
Available on request

Emery Industries' new vegetable oleic acid, Emersol 240 Vegetable Elaine, is discussed in this bulletin, which points up the product's all-vegetable origin, its excellent oxidation stability and its unusually bland odor.

Specifications, composition and applications are included along with charts comparing the new product's stability with other Emery oleic acids and ordinary grades, and the solubility of both potash and soda soaps.

General Dyestuff Corporation Circulars

THE following new circulars have been released by General Dyestuff Corporation, 435 Hudson St, New York 14, N Y:

G-705—Celliton Fast Blue AF Extra Conc
G-707—Celliton Fast Rubine 3BA-CF
G-708—Indanthrene Blue CLN Paste
Indanthrene Blue CLNWP Powder

Celliton Fast Blue AF Extra Conc is a dispersed, direct-dyeing, anthraquinone-type dyestuff manufactured for dyeing fast-to-light blue shades on acetate. It is said to possess good (3) resistance to atmospheric fading, or better resistance than that afforded by the commonly used fast-to-light acetate blues. GDC recommends it for dyeing medium-blue shades on nylon with good fastness properties. It is not offered for printing. Bulletin G-705 discusses the product in regard to acetate textiles and nylon, giving the usual application data, properties, fastness ratings, and mounted samples.

Celliton Fast Rubine 3BA-CF is a straight dispersed type of azo dyestuff (Pr 239) offered for the direct dyeing of Bordeaux shades of superior light fastness on acetate; it is also said to be suitable for dyeing nylon. This dyestuff is a nondusting powder, which reportedly disperses well without any tendency to form a tar in either cold or hot water. Bulletin G-707 discusses the relation of Celliton Fast Rubine 3BA-CF to acetate textiles, nylon and rubberizing. Directions for application of the dye to acetate or nylon and also for a clearing method are included along with properties, fastness ratings and mounted dyed samples.

Indanthrene Blue CLN Paste and CLNWP Powder are dispersed paste and dispersed powder brands, respectively, of a new, straight, anthraquinone vat dyestuff, which has only recently been developed for dyeing fast blues on cotton and rayon by either pigment or prereduced methods. Dyeings of this blue are said to be characterized especially by excellent resistance to chlorine bleaching (0.3% active solution) and to washing, along with good to excellent fastness to light. It is not offered for textile printing. Although both these brands are suitable for the same purpose and are identical in shade and working properties, they differ in strength with 100 p paste equaling 50 p powder. Bulletin G-708 discusses Indanthrene Blue CLN under the following headings: Shade and Fastness, Uses, Working Properties, Application on Cotton and Viscose Rayon (Reduction and Dyeing), Properties, and Fastness of Full Dyeings on Cotton and Rayon. Mounted dye samples are included for cotton and rayon yarns and also for cotton piece goods and spun rayon dyed by the pigment-padding process.

Other recent circulars of the General Dyestuff Corporation include the following:

G-692—Algosol Brown IRRD Supra—a water-soluble leuco ester of the straight thioindigo vat dyestuff Indanthrene Brown RRA Extra Suprafix (Pr 121).

G-701—Celliton Fast Rubine BA-CF—a straight dispersed type of azo dyestuff (Pr 238).

G-702—Celliton Fast Yellow GRA-CF—a well-dispersed azo dyestuff.

G-703—Alizarine Blue SEN Extra CF—a level-dyeing, anthraquinone type of acid dyestuff (listed under C I 1053).

G-706—Supranol Yellow GGA Conc CF—a straight, pyrazolene-azo acid dyestuff (CI 642).

G-711—Indanthrene Brilliant Green BN Pure Double Extra Paste Fine—a straight anthraquinone vat dyestuff (CI 1101).

Current Research and Development

The Wool Bureau, Inc
16 West 46th Street
New York 36, N Y
Available on request

The Wool Bureau, Inc, has released the third issue of its annual summary of wool research problems and activities, "Current Research and Development," prepared by Giles E Hopkins, Technical Director.

The first edition, issued in 1950 as "Suggested Research and Development Studies for the Woolen and Worsted Industry," included 16 major classifications of research designed to be of direct assistance in solving many current manufacturing problems. The latest edition shows that active work is now under way in most of the areas then suggested.

Because comment from the industry reflects considerable interest in the location of all forms of wool research, the 1952 edition amplifies the section devoted to programs on wool throughout the world. In recognition of this change, the new edition has been given the title "Current Research and Development." Active research on the suggested projects is outlined and general wool research on additional subjects is mentioned under eleven classifications including genetics, sheep management, preparation for market, chemical and physical structure of wool, fabric scouring, dyeing, mothproofing, cleaning, shrinkprofing, testing methods and standards, and testing instruments.

Research programs in the United States, Australia, England, the Netherlands, Union of South Africa and Sweden are included and lists of the major wool laboratories, their addresses and principal officers are provided.

Barenco Mixers

Barrington Engineering Corp
110 West 40th Street
New York 18, N Y
Available on request

Barrington Jet Mixers for wet mixing liquid and solids, and for emulsifying, homogenizing and dispersing applications, are covered in this two-color, four-page catalog.

Among the chief advantages cited by the manufacturer for the Barenco Mixers are the following: speeds up mixing cycles, accelerates chemical reactions and dispersion, reduces particle agglomeration, produces uniform and homogeneous dispersion of solids into liquids, mixes with minimum incorporation of air, mixes with little vortex and surface boil, and handles efficiently and quickly a wide range of liquid viscosities.

Standard Steel Chlorine Vaporizer for Converting Liquid Chlorine to Dry Vapor

Bulletin 132
The Whitlock Manufacturing Company
Hartford 10, Connecticut

This bulletin serves to outline the features, application, design details, construction and physical details, and capacity of Whitlock's standard steel chlorine vaporizer, which, the company claims, is ideal wherever relatively large quantities of chlorine are required. The unit reportedly will vaporize up to one ton of chlorine per hour with minimum steam consumption.

Microscopical Dyeing Phenomena Studies with the Microdyeoscope

Technical Bulletin No 825
H E Millson and L H Turl
Application Research Laboratories
Calco Chemical Division
American Cyanamid Company
Bound Brook, N J
Available on request

Details of a method for observing the appearance and behavior of textile fibers and the dye bath during the continuous and complete dyeing cycle are included in this bulletin.

The Microdyeoscope developed by the authors, permits both visual and photographic observation of dyeing phenomena approximating conditions encountered in the usual commercial dyeing process. This instrument and several dyeing studies carried out with its aid are described in this paper.

Besides providing means for control of all factors believed important in the dyeing process, the Microdyeoscope is said to permit continuous microscopic examination of the same fiber or fibers at all stages of the operation including wet processes either preceding or following the dyeing cycle.

The Microdyeoscope is not manufactured as a unit. A list of suppliers of parts from which the unit may be assembled are named in the bulletin.

Aula Water-Dilutable Pigment Printing Colors

Aula Chemical Co
Elizabeth, N J
Available on request

This technical bulletin describes Aula's water-dilutable pigment printing colors, which are resin emulsions of the oil-in-water type, where water is the continuous phase. Aula colors are based on a novel patented process which imparts outstanding brilliance and laundering resistance.

Neptune Bulletin 566

Neptune Meter Company
50 West 50th St
New York 20, New York
Available on request

Liquid meters for measuring more than 100 different industrial liquids in processing, batch mixing and cost control operations are described in Bulletin 566, which features several pages of Meter Selector Charts giving complete engineering and specification data to assist in selecting the meter best suited for a specific application.

More than 30 different meters for industrial liquids are covered. All are of the positive displacement type, for registering in volume or weight. Included are the relatively new Neptune Type S Auto-Stop meters, which are said to automatically deliver the desired quantity of liquid, eliminating waste and spoiled batches due to human errors, and providing uniform quality of product.

Liquids that can reportedly be handled by these meters include cold, warm and hot water, syrups, oils, soap solutions, brines and many common chemicals. Capacities of the meters range from 2 to 1000 gpm, with temperatures up to 250° F and pressures to 500 psi in some sizes. Many different register models are described.

Process Industries Bulletin On Valves and Meters

Rockwell Manufacturing Co
400 N Lexington Ave
Pittsburgh 8, Pa
Available on request

Companies in the process industries now have a bulletin which pictures and explains the various applications of Rockwell meters, remote registration unit, and Rockwell-built Nordstrom valves.

Described in detail are many models of the Nordstrom valve line including straight-way and multiport steel and semi-steel valves, semi-steel steam jacketed and steel hypreseal valves. Other Nordstrom products described are Nordco bronze, Mercoloy, stainless steel, ni-resist, monel, and nickel valves specifically for the erosive and corrosive conditions typical of many processing operations.

The Rockwell industrial meter, outlined in the bulletin, is a positive displacement type meter designed to measure almost all chemical, petroleum and industrial liquids by means of the hydraulic balanced oscillating piston principle. Also described and illustrated is the Rockwell remote registration unit, an accessory which permits visual readings at a suitable distance from the source of the metered liquid.

Organic Chlorine Compounds

Bulletin F-4769A
Carbide and Carbon Chemicals Co
30 East 42nd St, New York 17, N Y
Available on request

This "family booklet" describes the eleven organic chlorine compounds that are sold in commercial quantities by Carbide and Carbon; their uses, physical properties, specifications, and shipping data. Also included in the booklet is a bibliography that lists the important references in the chemical literature to the organic chlorine compounds discussed.

An important feature of this new booklet is a section covering the specifications of the organic chlorine compounds as they are shipped. In this section is a complete description of the laboratory test methods that are recommended by the Company for determining whether or not the commercial material meets these specifications. These control tests consist of the standard ASTM methods as well as new methods that have been developed in the Company's own laboratories.

Dynel Staple Fiber—General Information

Textile Fibers Department
Carbide and Carbon Chemicals Co
Union Carbide and Carbon Corp
30 East 42nd St, New York, N Y
Available on request

A summary of the properties of dynel and a discussion of what they mean in fabrics highlight this 8-page booklet illustrated.

Among the outstanding properties discussed are resilience, warmth, mothproofness, dimensional stability, rapid drying, wet or dry strength, resistance to combustion, resistance to acids and alkalies, mildewproofness and dyeability.

Butyl "Carbitol"

Bulletin F-7906
Carbide and Carbon Chemicals Co
30 East 42nd St, New York 17, N Y
Available on request

Physical and chemical properties, shipping data, and applications for Butyl "Carbitol", a product used for formulating nitro-cellulose lacquers and synthetic coatings and for printing and stamp pad inks, because of its excellent solvent characteristics. In specialty soaps, soluble oils and textile oils, it is used as a mutual solvent. It is an intermediate in plasticizer manufacturing, a component of gelatin size for cellulose acetate, a dispersant for vinyl chloride resins, and a "booster" for anionic wetting agents.

Nonisols

Alrose Chemical Company
Providence 1, R I
Available on request

In this 4-page bulletin Alrose discusses the Nonisols, their nonionic surface active agents of the polyoxyalkylene fatty ester type, from the standpoint of general properties and characteristics and also from their applicability within specific fields. For example, a section devoted to the use of the Nonisols in the textile field covers their uses as coning oils, wool oils, scouring, soaping, dyeing, etc.

General Catalog Prufcoat Protective Coatings

G Russell Hersam
General Sales Manager
Prufcoat Laboratories, Inc
50 East 42nd Street
New York 17, N Y
Available on request

Subjects of wide interest in this catalog include a list of chemical agents against which Prufcoat has been found effective, case history studies of five different types of applications in as many different industries, and a three point analysis of the advantages of maintenance painting done the "Prufcoat" way.

The entire back page of the catalog is devoted to a listing and brief description of the physical and protective qualities of all eight Prufcoat products. With this guide, the specific sealer, primer and finish material required for any painting problem may be selected. The appropriate technical bulletin numbers are included with each product description so that the reader may secure more detailed information.

Graver Tray-Type Deaerating Heaters

Bulletin WC 106
Dept 41-6
Graver Water Conditioning Co
216 West 14th Street
New York 11, N Y
Available on request

An introductory section of the bulletin explains the principles of successful deaeration and the essential elements of a deaerating heater. The features of Graver Tray-Type and Spray-Tray-Type Heaters are described in tabular form for greatest clarity, and illustrated by detailed drawings with identification of all parts. Included in the bulletins are also flow diagrams and photographs of typical Graver Heater installations.

Reference Chart on Fatty Acids and Their Derivatives

Technical Products Division
E F Drew & Co, Inc
15 East 26th Street
New York 10, N Y
Available on request

This chart includes the composition and important physical properties of the 46 most widely-used processing oils and fats. Approximately 17" x 11", printed in two colors on durable stock, it shows at a glance such useful data as an oil's iodine number, saponification value, per cent of unsaponifiables and its normal fatty acid composition.

In addition, the chart provides the empirical formulas, molecular weights and acid numbers of 23 fatty acids in common use. For many of these fatty acids, the boiling and melting points in Centigrade are also specified.

What's A Silicone?

Dow Corning Corporation
Midland, Michigan
Available on request

The Dow Corning Corporation endeavors to answer the question, "What's a Silicone?" with the aid of this 32-page booklet, which carries nine sections of illustrative and descriptive material on the versatile product. Each section is devoted to a field of use for the silicones, namely: polishes, water repellents, fluids, release agents, lubricants, defoamers, Silastic, protective coatings, and electrical insulation.

Lightnin Mixers Series E—1 to 500 H P

Catalog B-102
Mixing Equipment Co, Inc
217 Mt Read Blvd
Rochester 11, N Y
Available on request

In 32 illustrated pages, the new Lightnin Mixer catalog explains how fluid agitation results may be obtained for any process. It shows how to anticipate process changes by installing a mixer with interchangeable speeds and describes how a standard-design mixer can be adapted to give the versatility of a custom-design unit.

The new catalog also describes how mixing impellers are scientifically selected and sized for specific jobs; and how research is used to develop accurate prediction of fluid agitation results.

It discusses the entire line of turbine-type Lightnin Series "E" Mixers for open and closed tanks, which are said to offer up to 16 standard AGMA speeds from one basic gear reducer drive.

Award Winners, Textile Section Safety Contest

National Safety Council
425 N Michigan Ave
Chicago 11, Ill

Award winners in the safety contest conducted by the National Safety Council among companies in the textile field are included in this bulletin. The first page of the bulletin contains a summary of contest facts for background information.

First place winners receive a trophy. Winners of 2nd, 3rd and special awards receive certificates.

During 1951, contestants reported a total of 342,278,000 man-hours and 2502 reportable injuries. Compared with the 1950 contest this represents an increase of nine per cent in the reported exposure and an increase of 25 per cent in injuries.

Contestants in Division I operated 173,532,000 man-hours during the past year which was 18 per cent more than a year ago. There was a tremendous increase in the number of injuries reported; 1295 injuries, an increase of 62 per cent. Division II reported 1207 injuries occurring during the 168,746,000 hours that were worked. In comparison with the total reported last year, injuries have gone up 15 per cent while the exposure increased only 2 per cent.

Basing computations on the experience of companies enrolled in both the 1950 and 1951 contests, the final rate for the 1951 contest (7.31) was 13 per cent higher than for 1950.

Translations of Russian Reports on Dyes

A number of reports on the synthesis of dyes which originally appeared in the *Journal of General Chemistry of the USSR* during 1950 are now available in complete English translation, at $5.00 each report, from Consultants Bureau, 152 West 42nd Street, New York 18, N Y. Consultants Bureau publishes a complete English translation of the *Journal of General Chemistry of the USSR* (beginning with Volume 19, 1949) at $95.00 per year.

Reports pertinent to dyes which appear in the 1950 volume include:

D-1. *The Color of Organic Dyes and the Planar Structure of Their Molecules.* I. A I Kiprianov and I K Ushenko. Reports the synthesis of 15 new thiocyanine dyes.

D-2. *The Color of Organic Dyes and the Planar Structure of Their Molecules. II.* A I Kiprianov and I K Ushenko. Reports the synthesis of 6 new styryl dyes.

D-3. *Investigations in the Field of Hydroxyfuchsone Dyes. X. The so-called Tautomerism of Hydroxytriarylcarbinols.* I S Ioffe and Z Ya Khavin. The authors have found that the colored modifications of the hydroxytriarylcarbinols accepted by Gomberg as individual substances, as desmotropes of the hydroxytriarylcarbinols, are actually mixtures of the colorless hydroxytriarylcarbinols and the corresponding fuchsones.

D-4. *Investigations in the Field of Hydroxyfuchsone Dyes. XI. The Oxidative-Alkaline Decomposition of Hydroxyfuchsone Dyes of the Benzaurin Group.* I S Ioffe.

D-5. *Investigations in the Field of Hydroxyfuchsone Dyes. XII. Acid Transformation of Methoxyfuchsone Derivatives.* I S Ioffe.

D-6 *The Dislodgment of Substituents in the Azo Coupling of Para-Substituted Dimethylaniline.* S I Burmistrov.

D-7. *The Rate of the Azo Coupling of ArX as a Function of the Nature of the Aryl Group.* S I Burmistrov.

D-8. *Quinonebromoimides and Quinonedibromodiimides.* S I Burmistrov and N A Zuykova. The properties and reactions of two quinonebromoimides and four quinonedibromoimides are described.

D-9. *Absorption Spectra of Solutions of Organic Dyestuffs and Mineral Salts in the Red Region.* K V Flevorov and B V Ozimov.

D-10. *Ultraviolet Absorption Spectra of Some Heterocyclic Compounds in the Presence of an Alkali.* A E Lutsky. The absorption curves of rhodanine and N-phenylrhodanine in alcoholic solutions of sodium alcoholate have been plotted.

D-11. *Investigation in the Domain of Polycyclic Compounds. XI. On the Influence of the Composition of the Substituents on the Color of 1-Amino-4-x-Substituted Anthraquinones.* A M Lukin and K K Mozgova.

D-12. *Investigation in the Domain of Polycyclic Compounds. XII. On the Influence of the Composition of Substituents on the Color of 1-Benzoylamino-4-x-Substituted Anthraquinones.*

D-13. *Cyanine Dyes Containing Fluorine. I. Cyanine Dyes from Derivatives of 6-Fluorobenzthiazole.* A I Kiprianov and L M Yagupolsky. 11 thiocyanine dyes containing fluorine as substituent in the 6-position have been prepared.

D-14. *Investigation in the Domain of Polycyclic Compounds. XIII. On the Absorption Spectra of Anthrapyridone-acridone, Anthraquinone-acridone, Anthrapyridone, and Some of Their Derivatives.*

D-15. *The Internal Dissociation, Color and Chemical Activity of Inner Coordination and Cyclic Salts.* V I Kuznetsov.

D-16. *The Effect of pH upon the Color of Solutions of Inner Cordination and Cyclic Salts.* V I Kuznetsov.

Water Pollution in the United States

Supt of Documents
U S Govt Printing Office
Washington 25, D C
Price 35 Cents

This report (number 64) by the Public Health Service Federal Security Agency, is of three parts, covering the general background of the water pollution problem, a graphic analysis of the problem, and the costs and responsibilities involved in its abatement.

Appendices are devoted to 1) public policy on water pollution control, 2) recommendations of the president's water resources policy commission, 3) drainage basin summary reports on water pollution*, 4) selected bibliography, and 5) official state and interstate pollution control agencies.

* A limited number of these technical reports, which are the basis of the national report are available on request. They include 15 river basins: California, Colorado River, Great Basin, Lake Erie, Missouri River, New England, North Atlantic, Ohio River, Pacific Northwest, Southeast, Southwest-Lower Mississippi, Tennessee River, Upper Mississippi, Western Great Lakes and Western Gulf.

Hatch Price List

Hatch Textile Research
25 East 26th Street
New York 10, N Y
Available on request

With a revision of prices on most of their tests slightly upward since the issue of their last price list on September 15, 1950, Hatch Textile Research has issued this new listing for services within the textile testing field. The list is broken down into the following categories: textile tests on fabrics, yarns and fibers; wearability; construction tests, and hosiery and knit goods.

New Dowcide Booklet

Information about The Dow Chemical Company's entire "Dowicide" line of germicides and fungicides for mold and bacteria control is contained in a new loose-leaf folder which is available free upon request.

This booklet describes typical applications in which Dowicide products are used in industries such as paint, leather, adhesives, textiles, disinfectants, paper, and others where the control of microorganisms is of utmost importance. It also describes physical and chemical properties of these industrial germicides and fungicides.

Those interested can obtain this booklet by writing to Dowicide Sales, The Dow Chemical Company, Midland, Michigan, and indicating their interest in fungicides.

The Sur-Ten Meter

Joseph B Kushner
115 Broad Street
Stroudsburg, Pa
Available on request

The Sur-Ten Meter is a simple, practical device designed by Joseph B Kushner, renown electroplating engineer, to enable quick and accurate surface tension measurements under production conditions.

This leaflet gives a brief summary of some of the salient features of the instrument.

Modification of Wool by Peroxygen Compounds

Bulletin 35
Becco Sales Corp
Station B, Buffalo 7, N Y
Available on request

This 7-page, paper-bound bulletin gives both an over-all picture and a detailed explanation of the actual and potential uses of peroxygen compounds in four types of wool processing: "carroting", or imparting felting properties to wool fibers; "fulling"; shrinkproofing, and dyeing.

About Mooresville, What It Can Mean to You

Mooresville Mills
Mooresville, N C

This booklet was prepared to tell the story of Mooresville and Mooresville service in as concise a manner as possible, giving the flavor of the company's operation and some understanding of their concept of service. Particular emphasis is given the Apparel Fabrics Division, in line with Mooresville's recent announcement of a new line of blended synthetic apparel fabrics.

NAMES IN THE NEWS

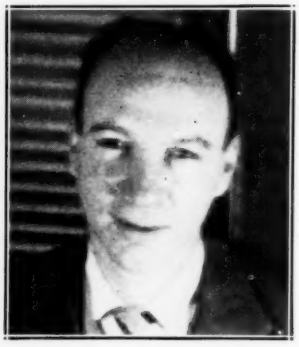
THE Technical Association of the Fur Industry honored DR JOSE B CALVA, internationally known Chemical Engineer, at its May 26 meeting by presenting to him the Leo Altenberg award for outstanding work in the field of fur technology. This award is presented annually to stimulate the advancement of scientific knowledge pertaining to fur processing, and is based on a lecture or paper presented on the subject.

Dr Calva, who has contributed new developments to almost every phase of the chemical process industries, is the inventor of the Calva Process for making imitation fine furs from sheepskins by permanently straightening wool fibers chemically. His address on the basic reactions involved in the procedure, given at the September 17 meeting of TAFI, won the award.

At the presentation meeting on May 26 Dr Calva gave a follow-up address dealing with "Chemical Engineering in the Dressing, Tanning and Dyeing Industry", which covered unit operations, quality control and profits, and the manufacture of better furs for a textile-competitive market.

WALTER G REGNARY, president and general manager of the Joanna Cotton Mill Co, joins three other collaborators of the Mechanical Processing Division, Southern Regional Research Laboratory, New Orleans under a rotation plan under which leaders in the industry contribute suggestions to help SRRL maintain a practical program of investigation. He replaces EPHRAIM FREEDMAN, director of Macy's Bureau of Standards, who has served in a similar capacity for the past three years.

Others serving at the present time are: NORMAN E ELSAS, M EARL HEARD and W ALEX TURNER.



Milton J Greene

MILTON J GREENE has been named New England sales and technical representative for the Hart Products Corporation, New York. Mr Greene, who will be in charge of all sales in New England, is making his home in New Bedford, Mass.

IN a recent ceremony at the home office of Nopco Chemical Company at Harrison, New Jersey, solid gold watches were awarded to thirteen employees who celebrate 25th Anniversaries with the Company this year.

The group includes CHARLOTTE WILLIAMS; A VICTOR JAY, PERC S BROWN, NICHOLAS KAZMIRYK, JAMES BREMNER, ADDISON WILSON, ROBERT JACKSON, WILLIAM E McGARRY, JOHN GOELLER, MEYER YABLONSKY, GEORGE H FAUX, ROBERT F McCLELLAN, and FRANK E KNAB.

At this same meeting, the Nopco 15-Year Club inducted sixteen new members: CORNELIUS ELPHICK, ULMER RAPER, PHYLLIS HAMMOND, RALPH ROGERS, EDWIN AYMAR, PAUL DRESSEL, GEORGE MILLER, ROBERT THOMAS, GEORGE CONOVER, THOMAS PHILLIPS, ELMER HEYDT, MICHAEL MUZUROFF, W MILLER, WILLIAM NOTHUM, HAROLD A SWANSON, and THOMAS J CAMPBELL.

Presentation of awards was made by Charles P Gulick, Chairman of the Board.

OBITUARY

LOUIS A GRUENWALD

LOUIS A Gruenwald, founder and president of De Paul Chemical Company, Inc, Long Island City, N Y, died on April 18th.

Mr Gruenwald came to the United States in 1920 with a chemistry degree from a college in Czechoslovakia. He completed his education at Columbia University, where he received an advanced degree.

His connection with De Paul Chemical lasted for over twenty years.

EUGENE THEIMER

Dr Eugene Theimer, research chemist for Standard Chemical Products, Inc, Hoboken, N J, died May 5th of a heart attack on his way to the plant.

Born in Pilsen, Czechoslovakia, he was a graduate of the University of Vienna and received his PhD from the University of Zurich before coming to this country in 1907.

He was with Standard Chemical Products, Inc for the last 12 years. Prior to that he had been with the Colgate-Palmolive-Peet Company and later was chief chemist for the Andrew Jergens Company, Cincinnati, Ohio.

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